

# THE UNIVERSITY OF ALABAMA

## INVITATION FOR BID

**ATTENTION: This is not an order. Read all instructions and terms and conditions carefully.**

<b>INVITATION NO.:</b>	<b>RETURN ALL COPIES OF BIDS TO:</b>
<b>Issue Date:</b>	<b>THE UNIVERSITY OF ALABAMA</b>
<b>Title:</b>	<b>PURCHASING DEPARTMENT</b>
<b>Buyer:</b>	<b>(Street Address) 1101 Jackson Ave Suite 3000</b>
<b>Phone:</b>	<b>Tuscaloosa, Alabama 35401</b>
<b>Email:</b>	<b>OR</b>
	<b>(Mailing Address) Box 870130</b>
	<b>Tuscaloosa, Alabama 35487</b>
	<b>PHONE: (205)348-5230 FAX: (205) 348-8706</b>

**Bid Responses may NOT be faxed or emailed.**

**IMPORTANT: SEALED BIDS MUST BE RECEIVED BY 02/12/2015 @ 2:00 P.M. CST TIME**

**Bid number and opening date must be clearly marked on the outside of all bid packages.**

1. Pursuant to the provisions of the State of Alabama Competitive Bid Law, Section 41-16-20 and/or 39-2, rules and regulations adopted there under sealed bids will be received on the items noted herein by The University of Alabama Purchasing Department until the date and time stated above. In accordance with Alabama State Bid Law Section 41-16-27, where applicable, the University reserves the right to enter into negotiations within thirty (30) days of the bid opening.
2. The University's [General Terms and Conditions](#) and [Instructions to Bidders](#), apply to this Solicitation and shall become a part of any contract issued hereunder.
3. For purposes of this Solicitation, the Solicitation documents shall consist of the following components:  
a) Invitation for Bid and any Addenda; b) [General Terms and Conditions](#); c) [Instructions to Bidders](#)  
In the event that any provision of the component parts of the Solicitation conflicts with any provision of any other component parts, the component part first enumerated shall govern.
4. This Agreement and any disputes hereunder shall be governed by the laws of the State of Alabama without regard to conflict of law principles.

### CERTIFICATION PURSUANT TO ACT NO. 2006-557

Alabama law (section 41-4-116, code of Alabama 1975) provides that every bid submitted and contract executed shall contain a certification that the vendor, contractor, and all of its affiliates that make sales for delivery into Alabama or leases for use in Alabama are registered, collecting, and remitting Alabama state and local sales, use, and/or lease tax on all taxable sales and leases in Alabama. **By submitting a response to this solicitation, the bidder is hereby certifying that they are in full compliance with Act No. 2006-557;** they are not barred from bidding or entering into a contract pursuant to 41-4-116, and acknowledges that The University of Alabama may declare the contract void if the certification is false.

### DISCLOSURE STATEMENT

1. If you or any owner, officer, partner, board or director member, employee, or holder of more than 5% of the fair market value of your firm or any member of their households is an employee of The University of Alabama, this information must be included in your solicitation response. Failure to disclose this information in your response may result in the elimination of your proposal from evaluation.
2. If you or any owner, officer, partner, board or director member, employee, or holder of more than 5% of the fair market value of your firm or any member of their households is an employee of The University of Alabama; and you or your firm is awarded a contract as a result of this solicitation, then within ten (10) days after the contract is entered into, you agree to file a copy of that contract with the State of Alabama Ethics Commission in accordance with Code of Alabama, Section 36-25-11 and upon request by the University furnish evidence of such filing.
3. By accepting payments agreed to in any purchase order resulting from this bid, Contractor certifies that to its knowledge no University employee or official, and no family members of a University employee or official, will receive a benefit from these payments, except as has been previously disclosed, in writing, to the University on the Disclosure Statement of Relationship Between Contractors/Grantees and Employees/Officials of The University of Alabama.

### AUTHENTICATION OF BID AND STATEMENT OF NON-COLLUSION AND NON-CONFLICT OF INTEREST

I hereby swear (or affirm) under the penalty for false swearing as provided in Code of Alabama 6-5-180 that

1. In accordance with Code of Alabama Section 41-16-25, amended 1975 that the attached response has been arrived at independently and has been submitted without collusion with, and without any agreement, understanding or planned common course of action with, any other vendor of materials, supplies, equipment or services described in the Invitation for Bids, designed to limit independent bidding or competition;
2. The contents of the bid or bids have not been communicated by the bidder or its employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid or bids and will not be communicated to any such person prior to the official opening of the bid or bids.
3. The bidder is legally entitled to enter into contracts with The University of Alabama and is not in violation of any prohibited conflict of interest, including those prohibited by the Code of Alabama 13A-10-62, as amended 1975.
4. I have fully informed myself regarding the accuracy of the statement made above.

### THIS AREA MUST BE COMPLETED

<b>DELIVERY AFTER RECEIPT OF ORDER:</b>	<b>NAME OF COMPANY:</b>	<b>PHONE:</b>
<b>FEDERAL EMPLOYER ID NO.:</b>	<b>ADDRESS:</b>	<b>FAX:</b>
<b>PAYMENT TERMS:</b>	<b>ADDRESS:</b>	<b>E-MAIL:</b>
<b>SHIPPING TERMS:</b>	<b>CITY, STATE &amp; ZIP CODE:</b>	<b>DATE:</b>
<b>F.O.B. DESTINATION-PREPAID AND ALLOWED</b>		
<b>QUOTE VALID UNTIL:</b>	<b>SIGNATURE:</b>	<b>Typed/Printed Name of Signor</b>

**SIGNATURE REQUIRED: This bid cannot be considered valid unless signed and dated by an authorized agent of the bidder. Type or print the information requested in the spaces provided.**

## INVITATION FOR BID

The University of Alabama requests sealed bids as per attached general and technical specifications or equal unless otherwise specified in the Special Conditions.

All Bidders submitting a bid must read all specifications carefully and respond accordingly. Failure to do so may eliminate your bid from consideration due to non-compliance.

### 1.0 GENERAL SPECIFICATIONS

- 1.1 Any contract resulting from this request will be made available to other eligible entities. This may include but is not limited to; The University of Alabama System, comprised of The University of Alabama; The UAB Enterprise, consisting of The University of Alabama at Birmingham, the UAB Health System and their related foundations and affiliates, and The University of Alabama in Huntsville, Huntsville, AL; and other state entities. Contracts resulting from the award of this request cover shipments by any entity listed above. Each entity will generate its own purchase orders, payments, etc. and delivery must be made according to the instructions on the purchase order.

The thrust of the contract is to obtain greater volume price discounts by combining the volume of purchases from participating entities within the State of Alabama.

- 1.2 All bid responses, technical information and any other attachments furnished to The University of Alabama in response to this request shall be submitted sealed in two formats, as an original copy (WITH SIGNATURE) and an electronic (PDF preferred) copy on a USB flash drive, unless otherwise stated.
- 1.3 The stated requirements appearing elsewhere in this solicitation shall become a part of the terms and conditions of any resulting contract. Any deviations there from must be specifically defined. If accepted by the University, the deviations shall become part of the contract, but such deviations must not be in conflict with the basic nature of this solicitation.

**Note: Bidders shall not submit their standard terms and conditions or purchase order terms as exceptions to or modification of the terms and conditions of this solicitation. Each exception to or modification of a University term and condition shall be individually listed by the bidder. Failure to follow this instruction may result in the determination that a bid submission is non-responsive to a solicitation and the rejection of that bid.**

- 1.4 The issuance of a University Purchase Order (P#) or a signed Contract document is required to constitute a contract between the successful Bidder and the University which shall bind the successful Bidder to furnish and deliver the commodities ordered at the prices, terms and conditions quoted and in accordance with the specifications of this Solicitation as well as the terms and conditions of the University's Purchase Order or Contract. No shipments are to be made to The University of Alabama without the issuance of a Purchase Order (P#). (Bidders are not to accept or ship items against a requisition number "R" #.)
- 1.5 Any questions concerning these specifications should be directed to the Buyer listed on the signature page.
- 1.6 No department, school or office at the University has the authority to solicit or receive official Solicitations nor authorize Solicitation or Contract changes other than the Purchasing Department. All solicitations are issued under the direct supervision of the Associate Director for Purchasing and in complete accordance with the State of Alabama Bid Law, Section 41-16-20 and University policies and procedures.
- 1.7 The terms and conditions included in this Solicitation along with any addenda, any University contract and/or University purchase order(s) issued referencing this Solicitation, the University's [General Terms and Conditions](#), [Instructions to Bidders](#) shall constitute the entire and exclusive Contract between the University and the successful Bidder.

1.8 **State of Alabama Immigration Law Compliance****Compliance Notice.**

By submitting a proposal to this RFP, a Respondent agrees that it will fully comply with the State of Alabama Immigration Law (Act 2011-535), as amended. A Respondent also shall enroll in the E-Verify Program prior to performing any work, or continuing to perform any on-going work, and shall remain enrolled throughout the entire course of its performance of the contract awarded pursuant to this RFP. By signing this contract, the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the state of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom." To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the University from any and all losses, consequential damages, expenses (including but not limited to, attorneys' fees), claims, suits, liabilities, fines, penalties, and any other costs arising out of or in any way related to Contractor's failure to fulfill its obligations contained in this paragraph or contained in the Alabama Immigration Law (Act 2011-535), as amended.

**State of Alabama Immigration Law (Act 2011-535)**

The successful contractor will be required to provide written certification they are in compliance with Section 9 of the State of Alabama Immigration Law (Act 2011-535).  
*One of the two required documents must be submitted prior to issuance of a University contract or purchase order. . Please complete and submit the form or document that applies to your company.*

**Complete this document only, if your company is not located in Alabama and your company does not have employees or subcontractors that work in the State of Alabama.**

- Certification of Compliance and affidavit forms included with this solicitation (*see Appendix – Certification of Compliance*)

**Complete the E-Verify document online, if your company is located in Alabama or your company has employees working in Alabama**

- Contractor's one-page E-verify Employment Eligibility Verification form (*see example included in Appendix - E-Verify*).

**If you have previously enrolled in E-Verify, follow these instructions:**

- Log onto [www.uscis.gov/everify](http://www.uscis.gov/everify)
- Click "Edit Company Profile" and print this one-page document.
- This one-page document must be submitted prior to a contract or purchase order being issued.

**If you are not currently enrolled in E-Verify, follow these instructions:**

- Log onto [www.uscis.gov/everify](http://www.uscis.gov/everify)
- Click "Enroll in E-Verify" and follow the directions to begin enrollment process.
- When enrollment process is complete, click "Edit Company Profile" and print this one-page document.
- This one-page document must be submitted prior to a contract or purchase order being issued.
- For further assistance please consult the [E-Verify Quick Reference Guide](#)

## 2.0 QUALIFICATIONS AND STANDARDS

Due to the importance of maintaining a safe University environment, it is imperative that the successful bidder meet certain qualifications that will guarantee The University of Alabama the successful Bidder is qualified to furnish and deliver products, equipment and services or furnish, deliver, install, service and/or repair equipment whichever is applicable as required in this Solicitation. In order for Bidders to qualify, the following requirements must be fulfilled:

- 2.1 The Bidder, if requested, must provide in writing, a statement that the Bidder has been regularly engaged in business for a minimum three (3) years engaging in furnishing, delivering, servicing, repairing and installing, equipment, goods, or services required in this Solicitation. In lieu of the minimum number of years in business, a performance bond may be required in the amount of one hundred (100%) percent of the contract price. This bond will be used to secure the completion of the project should the successful Bidder default for any reason. Failure to comply with this requirement may eliminate your bid response from consideration.
- 2.2 Each bidder required to provide a bond, shall submit a letter from a bonding agent licensed to do business in the State of Alabama stating that if the bidding company is the successful bidder, said bonding agent will furnish a 100% performance and payment bond covering and including products and service for the duration of the contract period. Said bond shall be subject to the approval and acceptance of The University of Alabama. The Letter and Bond shall be submitted to the University Purchasing Department and must be furnished within forty-eight (48) hours after request. The premium of the bond shall be paid by the successful bidder. Failure to provide the bond letter or bond will eliminate your bid from consideration in the bid award.

## 3.0 REFERENCES

References must include at least three (3) other universities, institutions or businesses, which the bidder has successfully provided products, services or installation of equipment similar to those required in this Solicitation in terms of manufacturer, size, features, service or type of installation. The references must include company name, address, project/delivery date, contact name, phone number, and email address.

## 4.0 PRODUCT SPECIFICATIONS

Specify all terms and conditions of the warranties associated with your products with your bid response.

## 5.0 PRICE QUOTATION

- 5.1 **IMPORTANT:** It is required that the PRICE QUOTATION SHEET(S) furnished with this Request for Price Quotation be completed and submitted with your proposal. **DO NOT** send generated price lists as your bid. Failure to comply with this request may eliminate your bid from consideration in the bid award.
- 5.2 All prices shall be quoted furnish and install (if applicable) FOB The University of Alabama, Tuscaloosa, AL 35487 prepay and allowed. Unit prices quoted must include any and all shipping and handling charges. Any freight claims will be the responsibility of the Bidder. The successful Bidder must transport at the time of set-up, the equipment and supplies necessary for this installation to campus. No direct shipments will be accepted.
- 5.3 It is the Bidder's responsibility to verify any information, measurements and obtain any clarifications prior to submitting the bid response. The University is not liable for any errors or misinterpretations made by the Bidder in response to this Solicitation.
- 5.4 The successful Bidder under the specifications required in this Solicitation shall furnish at its expense all equipment, labor, tools, supplies, transportation, insurance and other expenses necessary to fully perform any phase of the requirements of this Solicitation.
- 5.5 Quote prices firm for a period of ninety (90) days following the bid opening date unless otherwise stated in the Special Conditions. Bids that do not guarantee pricing firm for this period may be eliminated. Failure to quote the term for which your prices will remain firm may eliminate your bid from consideration.

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- 5.6 The quoted price must include but not be limited to all cables, wires, connectors, etc. to make a complete functioning unit unless specifically stated in the special conditions.
- 5.7 Include with your bid response complete details of your company's Return Merchandise policy, including, but not limited to, amount of any restocking fee required, procedures, limitations, contact person and phone number. While the University does not enter into any purchase with the intent to return items ordered, we do require this information be included with your bid response. Failure to include this information may be grounds for elimination of your bid from consideration.

### **6.0 DELIVERY, INSTALLATION AND TRAINING REQUIREMENTS**

- 6.1 Proposed delivery dates shall be stated in number of calendar days after receipt of order.
- 6.2 All items must be delivered directly to the University by the successful Bidder and placed according to the instructions supplied by the University.

### **7.0 INSURANCE**

- 7.1 See [General Terms and Conditions](#) for general Insurance Requirements, Additional Insurance requirements may be listed in the Special Conditions Section.
- 7.2 The successful Bidder shall provide the University Purchasing Department a certificate of insurance listing the required types of insurance and minimum liabilities specified in the [General Terms and Conditions](#) unless otherwise modified in the Special Conditions.
- 7.3 The certificate must be received by The University of Alabama Purchasing Department within three (3) days of request. Failure to comply with this request may eliminate your bid from consideration in the bid award.
- 7.4 The University reserves the right to terminate any resulting contract, if the Bidder fails to keep these policies in force for the above amounts or for the duration of the contract period.
- 7.5 The umbrella policy must be listed on the insurance certificate with an explanation of the coverage.

### **8.0 RESTRICTIONS ON COMMUNICATIONS WITH UNIVERSITY STAFF**

From the issue date of this Solicitation until a Contractor is selected and a contract award is made, Bidders are not allowed to communicate about the subject of the IFB with any University administrator faculty, staff, or members of the Board of Trustees except:

- The Purchasing Department representative, any University Purchasing Official representing the University administration, or others authorized in writing by the Purchasing Office and
- University Representatives during Bidder presentations.

If violation of this provision occurs, the University reserves the right to reject the Bidder's response to this Solicitation.

## 9.0 SPECIAL CONDITIONS

- 9.1 The University of Alabama is requesting sealed bids to **Furnish and Deliver One (1) Indoor Air Handling Unit for Nott Hall** as per attached Technical Specifications/Quotation Sheet or equal.
- 9.2 Delivery is needed **by April 27, 2015**, and may be a criterion of bid award. Specify your earliest possible delivery after receipt of order. WHEN THE AWARDED VENDOR CANNOT MEET DELIVERY REQUIREMENTS ON ANY ORDER, THE UNIVERSITY OF ALABAMA RESERVES THE RIGHT TO CONTACT THE NEXT LOWEST RESPONSIBLE BIDDER FOR AVAILABILITY.
- Delivery must be coordinated between the awarded vendor and the UA Project Manager or the UA Contractor assigned to this project. Contact information will be provided at the time of the bid award.
- 9.3 A UA Contractor assigned to this job will be responsible for the receiving, off-loading, Installation, testing and start-up of the Air Handling Unit.
- The awarded vendor is responsible for furnishing and delivering the equipment as well as providing a Manufacturer Representative at the time of Disassembly and Assembly of the equipment. (see technical specs for more details)
- 9.4 All costs quoted in Section 12.0 must include delivery, shipping, handling and any miscellaneous fees. Do NOT quote separate.
- Note: Shipping should be FOB The University of Alabama, Tuscaloosa, AL.**
- 9.5 **Invitation for Bid**  
No. 3.0 is amended and the University reserves the right to require references prior to the bid award. If requested, references shall be provided within seventy-two (72) hours.
- 9.6 **Bid Award**  
It is the intent of the University to award this contract to a single vendor that is deemed to be the most qualified, cost effective, responsible bidder submitting the best overall proposal. To be considered in the bid evaluation, bidders shall complete all the price quotation sheets included.
- The University reserves the right to negotiate pricing with the successful vendor, when quantities needed exceed those listed on the quotation sheets.
- 9.7 An electronic version of University's Terms and Conditions and Instructions to Bidders are available through The University of Alabama website (links below):

[General Terms and Conditions](#)  
[Instructions to Bidders](#)

## 10.0 TECHNICAL SPECIFICATIONS:

### 10.1 **Equipment:** Air Handling Unit

#### **One Temtrol (Or Equal) Indoor Horizontal Air Handling Unit with:**

- 3" Double Wall Construction
- Ruskin CD-50 Control Dampers
- 2", 30% Pleated Filters
- 15", 65% Bag Filters
- Pre-heat Hot Water Coil with Stainless Steel Coil Casings
- Chilled Water Coil with Stainless Steel Coil Casings
- Stainless Steel Drain Pan with 1.25" Threaded Male Connection
- Fan Wall Technology with Motor Overload Panel
- 460/3 Phase Voltage
- TEAO Premium Efficiency Motors
- Hinged Access Doors to all sections
- Marine Lights in all sections (120V power by others)

**Note:** Unit to be demounted into multiple sections. Largest section to be 39" x 91.5" x 134"

**Not Included:** Controls, Stats, Valves, VFD, Actuators, Humidifier (or Humidifier Drain Pan), or Spare Filters.

### 10.2 **General:**

- Factory fabricated (ITF) indoor air handling unit. (One piece construction unless noted by a demount on unit drawing). All units (single and multi-sectioned) ship fully assembled and sealed unless they exceed maximum shipping capacities. Multi-sectioned units, shipped in one piece, will require field disassembly by the installing contractor. All unit openings will be sealed for "shipping". Units will ship on an open flatbed trailer and require off-loading within three (3) hours of arrival at the jobsite or be subjected to demurrage fees. Upon arrival, units shall be cleaned (if necessary) and inspected by the contractor. Damaged or missing components must be noted on the bill of lading. Units should be properly stored indoors per Temtrol Operation and Maintenance manual. If units are stored for an extended period of time, routine maintenance is required.
- Disassembly and reassembly of unit at project site shall be supervised by a manufacturer's representative.
- Multi-sectioned units with factory furnished lights or electrical conduit will be furnished with flex connections at each demount. Electrical connections will be re-connected by installing contractor after the unit is reassembled and set in place.
- Right and left determined by facing in the direction of air flow with air hitting the back of your neck.
- All dimensions in inches.
- The Basis of design unit dimensions and openings have been selected to match the existing AHU-2 installation and field conditions. **Deviations from these dimensions are not allowed unless approved by the Engineer and UA.**
- The Air Handling Unit schedule indicates total static pressure only. All internal losses and available external static pressure are shown on the static pressure summary sheet in this submittal. Written verification of external static pressure is required by the engineer prior to release for production to prevent improper fan selection.
- Loose parts requiring field assembly and or mounting, spare components (belts, sheaves, bearings, filters etc.) if required (noted in this submittal) will ship with the unit (see bill of lading). Contractor shall verify before signing bill of lading.
- Manufacturer must provide a one year parts and labor warranty.

10.3 **Certification:**

- ETL Listed

10.4 **Unit Base/ Floor/ Framework:**

- Unit base frame manufactured with heavy gauge rectangular structural tubing and coated with an air dried (phenolic) corrosion inhibitive finish. Perimeter base rails are fitted with lifting lugs at the unit or section (if demounted) corners. "Double Bottom" floor includes heavy gauge C-Channel and structural angle support members. The floor cavity is insulated with closed cell spray foam insulation and sealed for airtight / watertight application. Foam is 0-, 0-, (Non VOC) UL 94HF1 rated. Upper perimeter support "mechanical frame" is gasketed (thermal break) prior to attachment of the unit panels. See unit data sheet for specified floor and / or frame construction.

**C-Channel support members are formed 14ga Glav. C-Channels.**

10.5 **Exterior Panel (Painted):**

- Exterior panels are mill coated on both sides with a Polyceram 3200 coating system including polyester resin for long term corrosion resistance which meets or exceeds the following standards. (ASTM B-117) Salt Spray Resistance 5% salt fog at 95 degrees F. Passes 2,500 hrs. (ASTM D-2247) Humidity Resistance 100% salt fog at 95 degrees F. Passes 2,500 hrs. The complete exterior is painted with a finish coat of industrial air-dried (alkyd) enamel. Unless otherwise indicated on unit data sheet, exterior color will be Sandstone.

Panels are fabricated using state of the art, robotic manufacturing cells to guarantee an air tight precision fit. Formed heavy gauge panels are insulated and encased with an internal liner then fastened to the gasketed (thermal break) upper "mechanical frame" assembly. All panels are completely removable from the exterior. See unit drawings for total wall thickness, material and applicable inner liner.

10.6 **Insulation/ Liners (Double Wall Construction):**

- Unit panels and liners are filled with a dual density fiberglass (R4.2 per inch thick). The insulation has an effective thermal conductivity (C) of .24 (BTU in./sq.ft. F°) and a noise reduction coefficient (NRC) of 0.70 per one inch thick (based on a type "A" mounting). Coefficients meet or exceed a 3.0 P.C.F. density material rating. Insulation meets erosion requirements of UL 181 facing the air stream and fire hazard classification of 25/50 (per ASTM-84 and UL 723). See unit drawing for total wall thickness and internal double wall liners are as indicated on unit drawings.

**3" Thick Fiberglass Casing Provided.**

10.7 **Access Doors:**

- Access door panels are double wall construction with dual full perimeter gasket. The extruded aluminum, foam injected door frame features built in thermal break design. Door hinges are completely (3 way) adjustable, die cast stainless steel. Door handles are operable from inside and outside the access door. Optional windows, if specified and shown on the unit drawing, are 10x10 dual thermal panes, UV rated safety glass. See unit drawing and data sheet for mechanical safety requirements.

10.8 **Fanwall ® / Fans:**

- The multiple fan array systems include multiple, direct driven, arrangement 4 plenum fans constructed per AMCA requirements for the duty specified class III as required. Fans are rated in accordance with and certified by AMCA for performance. All fans are selected to deliver the specified airflow quantity at the specified operating Total Static Pressure and specified fan/motor speed. The fan array is selected to operate at a system Total Static Pressure that does not exceed 90% of the specified fan's peak static pressure producing capability at the specified fan/motor speed. Each fan/motor cube or cell includes a minimum 10 gauge, G 90 Galvanized steel intake wall, .100 aluminum spun fan inlet funnel, and a 7 gauge steel motor support plate rail and structure. Each fan/motor assembly is dynamically balanced to meet AMCA standard



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204-96, exceeding category BV-5, to meet or exceed an equivalent Grade G.55, producing a maximum rotational imbalance of .03" per second peak, filter in (.55mm per second peak, filter in) For optional fan construction see unit data sheet. NOTE: After units are set in place and prior to startup, fan wheels should be hand rotated to check for clearance between wheel and fan inlet cone. If adjustment is required; installing contractor should refer to the Temtrol Operation and Maintenance manual provided.

**Included: FBD Back draft damper provided as indicated on unit drawing (see attached cut sheet).**

### 10.9 **Fanwall ® / Motors:**

- FANWALL motors are TEAO premium efficiency and selected at the specified operating voltage and rpm as indicated on the fan performance curves. Motors are (NEMA MG-1 Part 30 and 31, section 4.4.2.rated) manufactured by Baldor (or as indicated on unit data sheets) for use in multiple fan arrays that operate at varying synchronous speeds as driven by an approved VFD. All motors include permanently sealed minimum L10-300,000 hr bearings and the Baldor shaft grounding brush assembly to protect the motor bearings from electrical discharge machining by safely channeling harmful shaft currents to ground. Motors have a 1.15 service factor, Class H rated wire, Class H rated varnish and Class F insulation. Motors are rated for 120 Hz continuous operation.

### 11.0 **Electrical:**

- Unless indicated on the unit data sheet, all electrical and automatic control devices are to be furnished and installed in the field by OTHERS. See unit data sheet for specified electrical requirements.

### 11.1 **Coils:**

- All coil assemblies are leak tested under water at 315 PSIG. PERFORMANCE is CERTIFIED under AHRI Standard 410. Coils exceeding the range of AHRI standard rating conditions will be as noted on the coil computer printout. Coils are constructed of seamless copper tubing mechanically expanded into fin collars. Fins are die formed plate type. Headers are seamless copper with die formed tube holes. Intermediate tube supports supplied on coils over 44" fin length with an additional support every 42" multiple thereafter. See unit data sheet (coil performance physical data) for options as specified.

#### **16ga 304 SS Casings Provided On Water Coils.**

- Type WC (water coils) - Connections are male pipe thread (MPT) Schedule 40 Red Brass. Vents and drains are provided for complete coil drainage. Coils are suitable for 250 PSIG working pressure.

### 11.2 **Condensate Pan:**

- The entire condensate pan / coil support assembly is fabricated from 16 gauge 304 stainless steel. The pan, recessed into the foam insulated-double bottom base is completely sealed. All pans are "Double Bottom" construction with welded corners. Note: Drain connections are standard 1-1/4" MPT connection unless noted on unit data sheet. Unless indicated on the unit drawing, pan is pitched towards a single drain connection as indicated on the unit drawing. Note: Units in excess of 160 inches in width may require drain connections on both sides of the unit or staggered connections on the same side. See unit drawings for drain locations.

### 11.3 **Filters/ Filter Gage:**

- See unit data sheet for specific Filtration / Filter gage requirements.

### 11.4 **Dampers:**

- Control dampers feature .125" thick 6063T5 extruded aluminum frame, 6063T5 extruded aluminum airfoil type blades, 1/2" axels, molded synthetic bearings, flexible compression metal

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jamb seals and Ruskiprene blade edge seals mechanically locked into the blade edge. All damper linkage and jack shafting are concealed within the frame. Dampers are leakage and pressure rated per AMCA 500. Actuators are both furnished and mounted by OTHERS.

### 11.5 **Technical Specification and Drawing Attachments:**



Model Number: ITF-DH59

Unit Tag: AHU-2

Report Created: Submittal 04

Serial Number:  
Job Number: -

Job Name:	UNIV. OF ALABAMA NOTT HALL	Unit Type:	INDOOR
Rep. Firm:		Unit Weight:	18000 Lbs.
Rep. Contact:			
Temtrol Eng.:			

## Unit Notes

MAX SECTION LENGTH = 40"L  
UNIT LENGTH MUST BE 263"L

## Unit Details

Exterior Casing:	16ga. Galvanized - Painted				
Floor Material:	16ga. Galvanized				
Sub Floor Material:	20ga. Galvanized				
Base Size:	9 in.				
Access Doors:	<u>Quantity</u>	<u>Windows</u>	<u>T.O.S.L.</u>	<u>P.K.S.</u>	<u>Louvers</u>
	4	0	4	0	0

## Static Pressure Summary

### Supply

<u>Description</u>	<u>Static</u>
CABINET	0.10
HEATING 5WC - 2 - 36 X 118 X 2 - 6 AL	0.10
COOLING 5WC - 4 - 36 X 118 X 8 - 10 AL	0.94
2" PLEATED FLAT 30%	0.50
15" NON-SUPP. BAG 65%	0.80
O/A CD50 DAMPER	0.13
S/A CD50 DAMPER	0.13
HUMIDIFIER GRID	0.05
<b>Internal Static Pressure</b>	2.75
<b>Available External Static Pressure</b>	4.25
<b>Total Supply Static Pressure</b>	7.00

Comment:

**Electrical** VAC/PH/HZ: 460/3/60

Unless otherwise noted below all electrical and automatic control devices are furnished and installed by others in the field.

460/3/60

Guarded vapor-proof light fixture(s) with 25W compact fluorescent light bulb(s). Fixture locations shown on unit drawings are approximate.

All lights controlled by a single light switch. One GFI outlet provided.

120 volt power for lighting and/or GFI outlets shall be provided by Others

Motor Overload Panel with aux. contacts.

Single feed Overload Panel.

Model Number: ITF-DH59

Unit Tag:

AHU-2

Report Created:

Submittal 04

Serial Number:

Job Number:

-

## FWT-16-80 [SUPPLY FAN] - QTY 6

### PHYSICAL

Array: Row x Column (QTY) 2 x 3 (6)  
 Airflow Monitor / QTY  
 Cone Constant Pp 1490(Pp)^0.5  
 Back draft dampers / Qty FBD-6 (6 Qty)  
 Cone Type Curved  
 Motor / Frame / Qty 7.5 hp / 213T / 6  
 VAC/PH/HZ - RPM / Encl 460/3/60 - 3500/TEAO  
 Total Hp 45 hp

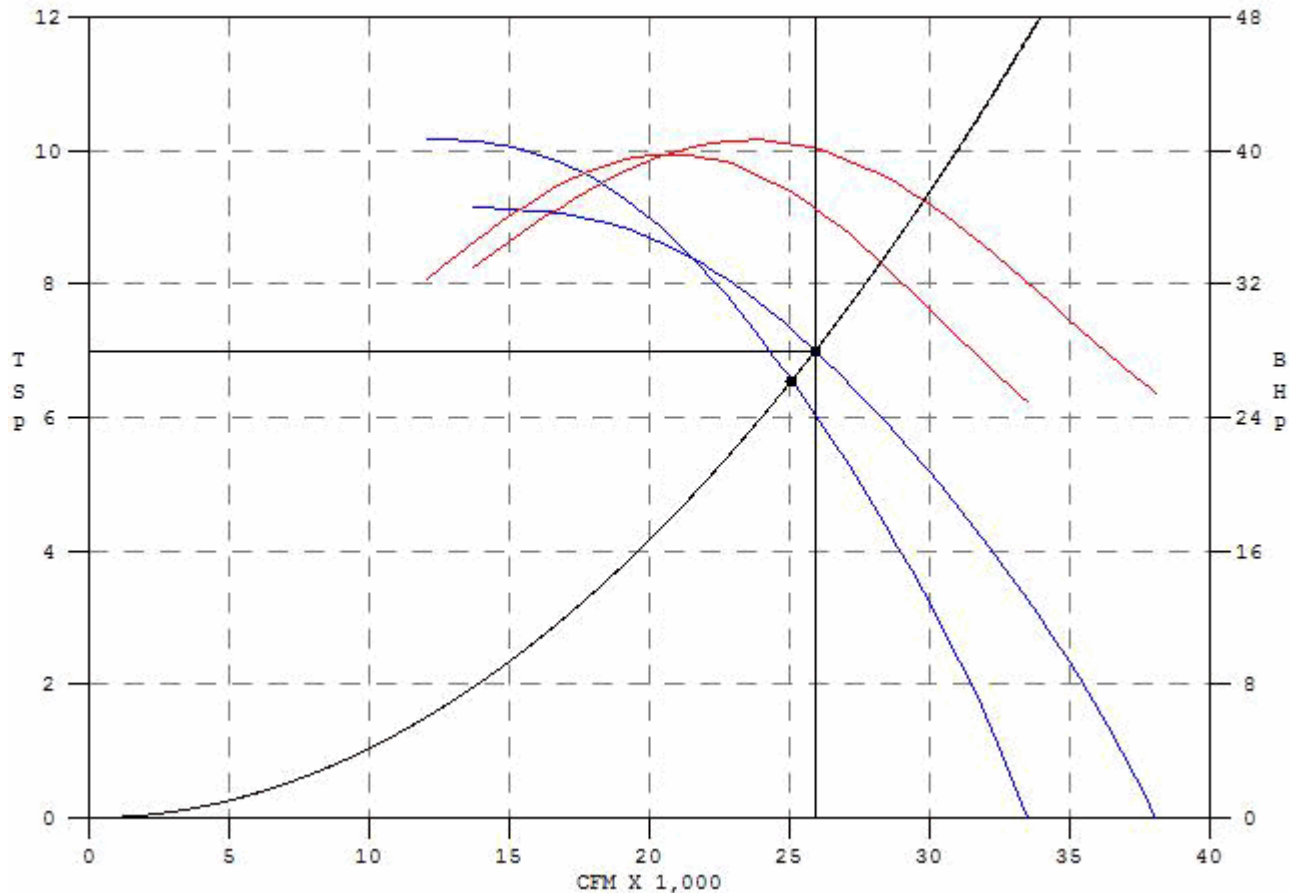
### OPERATION

100% w/ Failed Fan  
 Total CFM: 25930 cfm 25079 cfm  
 CFM per fan: 4321.67 cfm 5015.80 cfm  
 TSP: 7.00 in. Wg. 6.55 in. Wg.  
 Fan RPM: 3394 rpm 3581 rpm  
 Active Cells: 6 5  
 BHP per fan: 6.68 hp 7.50 hp  
 Operating Hz: 57.8 Hz 61.0 Hz  
 Connected BHP: 40.10 hp 37.49 hp

SOUND OCTAVE BAND	63hz	125hz	250hz	500hz	1000hz	2000hz	4000hz	8000hz	A-Weighted
Inlet / Discharge	97 / 89	91 / 86	90 / 91	97 / 85	92 / 85	91 / 82	91 / 81	87 / 76	99 / 90

Comment:

-



Model Number: ITF-DH59

Unit Tag: AHU-2

Serial Number:

Report Created: Submittal 04

Job Number: -

## [ Coil # 1 ] Hot Water Coil - (Qty. 2) 5WC - 2 - 36 x 118 x 2 - 6 AL

PHYSICAL		OPERATION	
Total Face Area / FV :	59.0 / 440.0	ACFM / SCFM - Alt.:	25,930 / 29,243 - Sea Level
Coil FH x FL:	36.00 X 118.00	EDB :	10 °F
Rows - FPI:	2 - 6	LDB :	68.9 °F
Serpentine:	1.00		
Fin Thickness / Matl:	0.008" / AL	Sensible Heat:	1,867,920 Btu/Hr
Tube O.D. / Wall:	5/8" / 0.020"	Fluid - %:	Propylene - 30
Tube Material:	CU	EFT / LFT:	180 / 160 °F
Case Thickness / Matl:	CT: 1" CB: 1" / 16 GA 304 SS	GPM:	195.75
Sup.Conn - Qty / Size:	(1) 2-1/2" MPT SCH40 Red Brass Per Coil	Fluid Velocity:	4.50 ft/s
Ret.Conn - Qty / Size:	(1) 2-1/2" MPT SCH40 Red Brass Per Coil	FPD:	8.57 ft
Coating:	NONE	APD:	0.10 in. Wg.
		Hand:	RIGHT
		FFI:	0.00

### Comment:

- (Glycol) falls outside the range of Standard Rating Conditions specified in Table 1 of 'AHRI Standard 410'.
- Coil is NOT certified by AHRI

## [ Coil # 2 ] Chilled Water Coil - (Qty. 2) 5WC - 4 - 36 x 118 x 8 - 10 AL

PHYSICAL		OPERATION	
Total Face Area / FV :	59.0 / 440.0	ACFM / SCFM - Alt.:	25,930 / 24,111 - Sea Level
Coil FH x FL:	36.00 X 118.00	EDB / EWB:	95 / 78 °F
Rows - FPI:	8 - 10	LDB / LWB:	50.2 / 50.1 °F
Serpentine:	2.00	Total Heat:	2,270,697 Btu/Hr
Fin Thickness / Matl:	0.008" / AL	Sensible Heat:	1,201,502 Btu/Hr
Tube O.D. / Wall:	5/8" / 0.020"	Fluid - %:	Water
Tube Material:	CU	EFT / LFT:	44 / 56 °F
Case Thickness / Matl:	CT: 1" CB: 1" / 16 GA 304 SS	GPM:	377.29
Sup.Conn - Qty / Size:	(2) 3" MPT SCH40 Red Brass Per Coil	Fluid Velocity:	4.40 ft/s
Ret.Conn - Qty / Size:	(2) 3" MPT SCH40 Red Brass Per Coil	FPD:	9.60 ft
Coating:	NONE	APD:	0.94 in. Wg.
		Hand:	RIGHT
		FFI:	0.00

### Comment:

- Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at [www.ahridirectory.com](http://www.ahridirectory.com).

## [ Filter Bank # 1 ] Pre - 2" Pleated Flat - 30% / Final - 15" Non-Supp. Bag - 65%

Type: Flat	Frames: Galvanized	Location / Service:	Up Stream / Face Load
Bank Size: 72 H x 120 W	(Qty) Size: (15)24x24		
Face Area (ft²) / FV (fpm):	60.0 / 432		
Filter Bank Gauge:	Dwyer Model 2003		
Media - Pre Filter	APD: 0.50	Class: II	Supplied Sets: 1 Set
Media - Final Filter	APD: 0.80	Class: II	Supplied Sets: 1 Set
Clips:			
Comment: Filter frames, media and holding clips are furnished by Factory.			



Model Number:ITF-DH59

Unit Tag:AHU-2

Report Created:Submittal 04

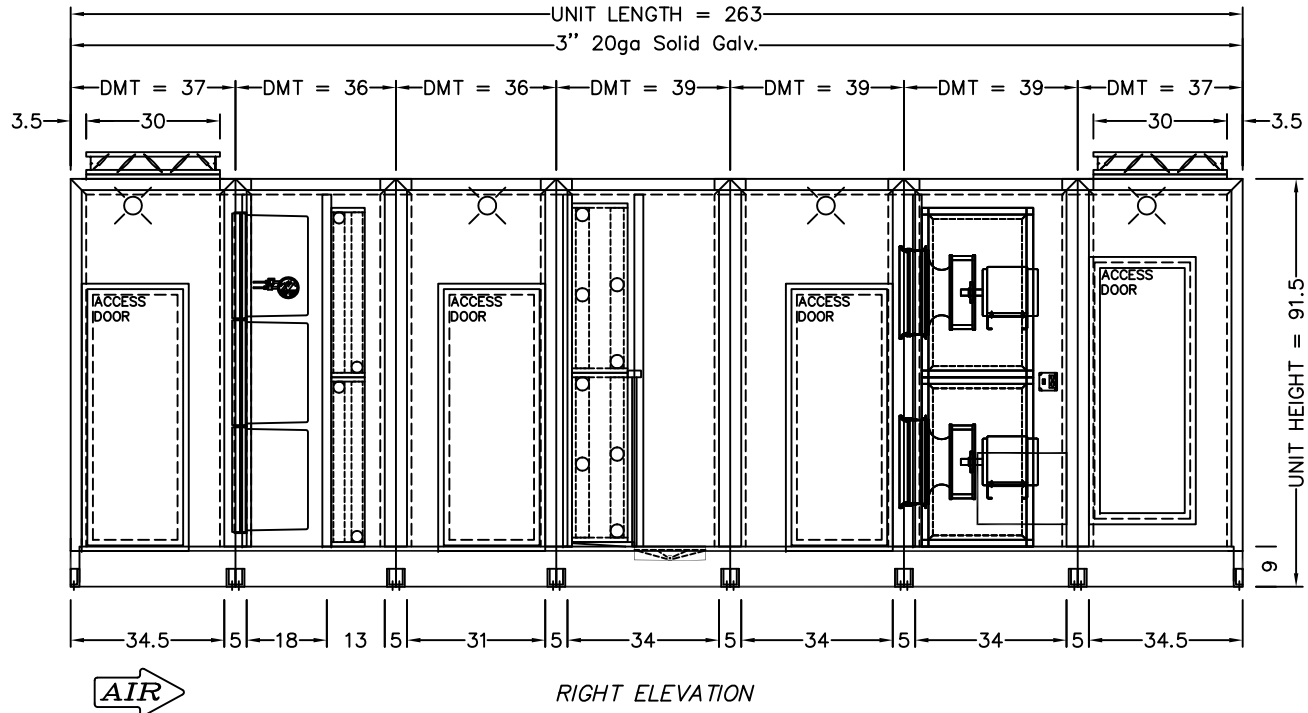
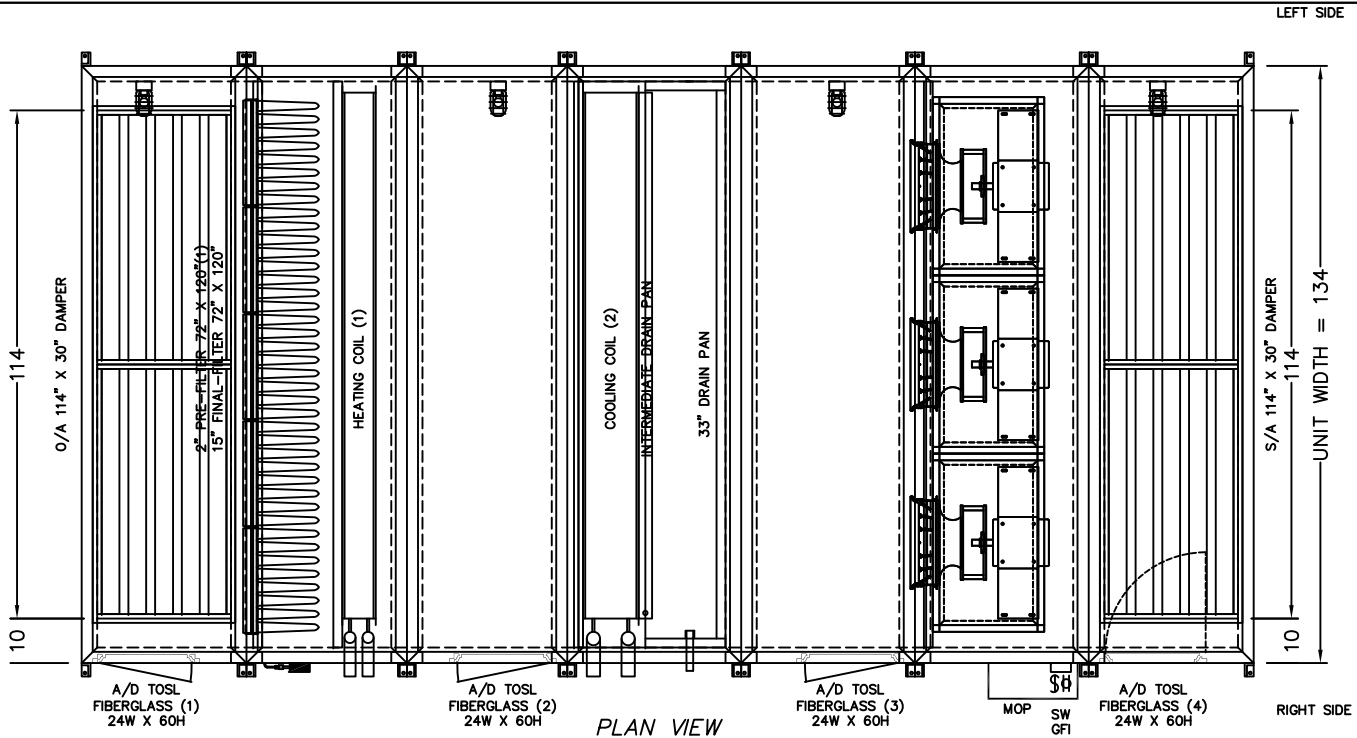
Serial Number:

Job Number:-

Dampers

Description	Bank Size (AxB)	Location	CFM	FV	Model # / Action
O/A	114 x 30	Top	25930	1251	CD50 / Opposed
S/A	114 x 30	Top	25930	1251	CD50 / Opposed

<b>t Temtrol</b> <i>a CES Group Brand</i> PH (405) 263 7286 www.Temtrol.com Temtrol Engineer: Drawing Date:		Job Name: <b>UNIV. OF ALABAMA NOTT HALL</b>		Model No: <b>ITF-DH59</b>	
PS3 Ver: 2011.100		Rep. Firm: Rep. Contact:		Unit Type: <b>INDOOR</b>	
Rep. Firm:		Submittal Rev 04		Unit Tag: <b>AHU-2</b>	
Rep. Firm:		# of Pieces: <b>7</b>		Unit Serial No:	
Rep. Firm:		Approx. Weight: <b>18000 lbs</b>		Unit Serial No:	



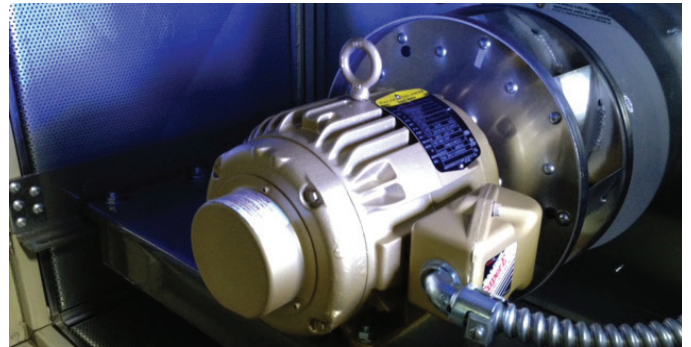
# Baldor Super-E Motors

## Premium efficiency inside and out

The Baldor Super-E® premium efficient motor is standard in FANWALL® applications. Motors are balanced to vibration levels at half the allowable NEMA limits. The totally enclosed air over (TEAO) design runs quiet, is very compact and is a superior enclosure for dirty or wet environments. The keyless shaft combined with a compression fan mounting system allows for easier assembly and maintenance and contributes to a more balanced system.

The insulation system in a motor is designed to handle the sum of three temperatures: an ambient design temperature 40° C / 104° F; the temperature rise in the motor under load; and a 10° C hot spot allowance. For example, a NEMA Class B rated motor can have a maximum motor temperature rise during operation of 80° C. This results in a total motor temperature rating of 130° C (40° C ambient temp. + 80° C motor temp. rise + 10° C hot spot temp.). A NEMA Class F rating allows for a motor temperature rise of 105° C yielding a total motor temperature rating of 155° C. A NEMA Class H ratings allows for a 125° C motor temperature rise for a total motor temperature rating of 180° C. Additionally, NEMA allows the motor temperature rating limit to increase by 10° C for motors rated with a 1.15 service factor. Baldor TEAO motors provided for FANWALL systems incorporate Class H rated wire and Class H rated varnish as part of the insulation system.

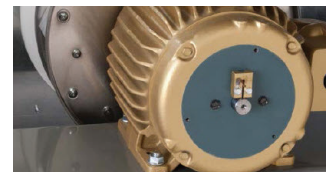
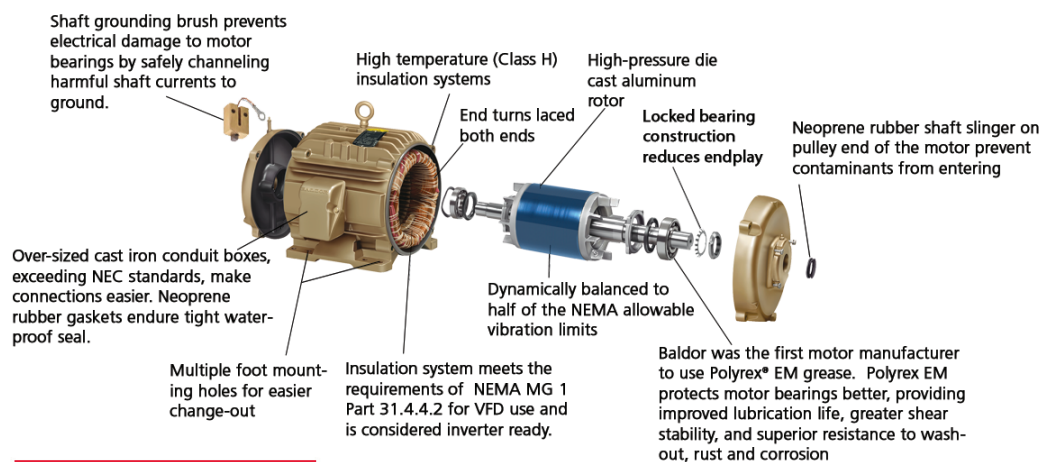
Testing: Through actual testing of Baldor TEAO motors in FANWALL applications, Baldor and Temtrol have determined that the temperature rise in these motors is actually very low—in some cases only 40° C. This is well below the 125° C temperature rise for the Class H rating, and adds to the safety margin over the actual ambient temperature. The increased airflow over the motor fins, produced by the Coplanar Silencer® design in FANWALL systems, helps to keep the motor windings cooler and well below a Class H 180° C (356° F) rating. This unique cooling design is what makes incremental horsepower motors possible.



Incremental horsepower motors carry a full factory warranty, maintain a 1.15 service factor, are constructed for 120 Hz continuous operation, and are readily available from Baldor or Temtrol stock inventory.

These motors are engineered and manufactured to incorporate the Baldor shaft grounding brush assembly. The shaft grounding brush prevents electrical damage to motor bearings by safely channeling harmful shaft currents to ground. Utilizing long-life carbon brush technology, the conductive brush provides the path of least resistance for damaging shaft currents, preventing electrical damage to motor bearings and dramatically extending motor life. Now you have this protection from a single-source.

Frame mounting dimensions are industry standard for readily available replacement. The motors utilize an insulation system which meets the requirements of NEMA MG1 Part 31.4.4.2 for VFD use, and is considered inverter ready. The motors are lubricated with Polyrex EM Polyurea grease. This lubricant provides a life of up to four times that of other polyurea greases. Cast iron motor construction is rigid, durable and quiet. Locked bearing construction reduces endplay and provides a stable bearing support system.



Bottom photo shows Baldor shaft grounding brush without the protective cover.

**BALDOR**  
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**t Temtrol**  
a CES Group® Brand

*Delivering Customer Satisfaction One Unit At A Time*



# Baldor TEAO Motors for FANWALL® Systems

208, 230, 460 Volts



1800 RPM									
HP	FRAME	AMPS (3PH)			Sync. Spd.	Max. Hz Rated HP	EFF.	LBS.	SPEC. #
		208V	230V	460V					
1	143T	2.9	2.8	1.4	1750	120	86.5	45	05G660W052G1
1.5	145T	4.2	4	2	1740	110	86.5	54	05G660W659G1
2		5.7	5.4	2.7	1725	100	86.5	58	05G660W649G1
2.5		6.8	6.4	3.2	1715	90	86.5		05G660W649G2
3	182T	8.4	8	4	1760	120	89.5	85	06K111W356G1
3.5		9.9	9.4	4.7	1745	105	87.5		06K111W356G2
4		11.1	10	5	1735	90	86.5		06K111W356G3
4.5		12.4	11.8	5.9	1725	75	84		06K111W356G4
5	184T	13.7	13	6.5	1750	120	90.2	105	06K111W567G1
5.5		14.7	14	7	1750	110	88.5		06K111W567G2
6		15.8	15	7.5	1740	100	88.5		06K111W567G3
6.5		16.8	16	8	1735	90	87.5		06K111W567G4
7		17.9	17	8.5	1740	75	86.5		06K111W567G5
7.5	213T	19.8	19	9.5	1770	110	91.7	147	07M267X790G1
8		21	20	10	1765	100	91		07M267X790G2
8.5		22.3	21	10.5	1765	95	91		07M267X790G3
9		23.5	22	11	1760	85	90.2		07M267X790G4
9.5		24.8	23	11.5	1755	75	89.5		07M267X790G5
10	215T	26.3	25	12.5	1760	110	92.4	169	07M267X776G1
10.5		28	25.6	12.8	1760	100	92.4		07M267X776G2
11		28.8	26.8	13.4	1760	95	92.4		07M267X776G3
11.5		30.1	27.8	13.9	1755	90	91.7		07M267X776G4
12		30.4	29	14.5	1755	75	91.7		07M267X776G5

3600 RPM									
HP	FRAME	AMPS (3PH)			Sync. Spd.		EFF.	LBS.	SPEC. #
		208V	230V	460V					
1	143T	3	2.8	1.4	3450		84	43	05F637W546G1
1.5	145T	4.3	4	2	3450		85.5	50	05F637W116G1
2		5.4	5	2.5	3450		86.5	56	05F637W115G1
2.5		6.7	6.2	3.1	3450		86.5		05F637W115G2
3	182T	7.5	7	3.5	3500		89.5	81	06G629W727G1
3.5		8.6	8	4	3490		89.5		06G629W727G2
4		9.9	9	4.5	3480		89		06G629W727G3
4.5		11	10	5	3460		88.5		06G629W727G4
5	184T	12.2	11.4	5.7	3490		90.2	92	06G629W730G1
5.5		13.7	12.6	6.3	3480		90.2		06G629W730G2
6		15	13.6	6.8	3470		90.2		06G629W730G3
6.5		16.2	14.8	7.4	3460		89.5		06G629W730G4
7		17.5	15.8	7.9	3450		89.5		06G629W730G5
7.5	213T	18.6	17.2	8.6	3525		91	154	07L654W280G1
8		19.6	18.2	9.1	3520		91		07L654W280G2
8.5		20.8	19.2	9.6	3510		91		07L654W280G3
9		22.5	20.2	10.1	3500		91.7		07L654W280G4
9.5		23.5	21.2	10.6	3500		92.4		07L654W280G5
10	215T	24.4	22.4	11.2	3500		91.7	170	07L654W723G1
10.5		25.2	23.3	11.6	3500		91.7		07L654W723G2
11		26.2	24.2	12.1	3500		91.7		07L654W723G3
11.5		27.6	25.2	12.6	3500		91.5		07L654W723G4
12		28.8	26.2	13.1	3495		91.5		07L654W723G5

All motors have a 1.15 Service Factor, Class H insulation, and a TEAO enclosure.  
All motors are constructed for 120 Hz continuous operation.



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TEM-MOT-SS-1  
MAY 2014  
www.temtrol.com

# Baldor Super-E® Motors with Shaft Grounding Brush

## Applications:

Fan motors, pump motors, baggage handling and other general purpose applications using an adjustable speed drive.

## Features:

- Off-the-shelf availability for quick shipment through the MOD-Express® department
- Ideal for custom motors; can be mounted internally or externally to motor
- Meet or exceed NEMA Premium® efficiencies
- Class F insulation with Inverter Spike Resistant insulation system - meets NEMA MG 1 Part 31.4.4.2 (Class H available on custom designs)
- Inverter Ready
- 1.15 service factor with Class B temperature rise at rated horsepower (sine wave)
- Heavy duty frames with cast endplates, suitable for mounting in any position
- Dynamically balanced rotors for reduced vibration and quiet operation
- Ball bearings with Mobil Polyrex® EM grease
- Three year limited product warranty



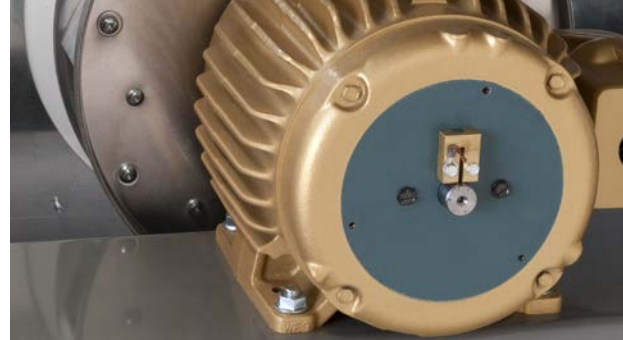
**NEMA**  
**Premium®**

**BALDOR®**  
A MEMBER OF THE ABB GROUP

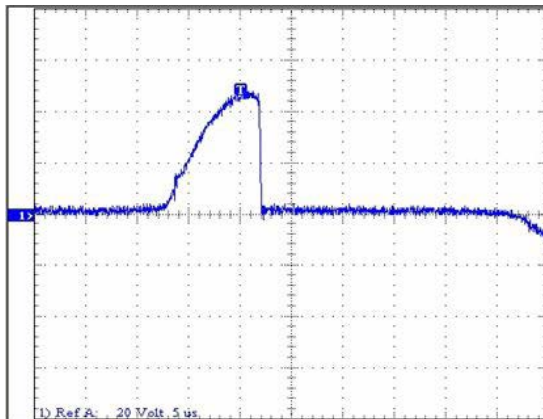


## Shaft Grounding Brush

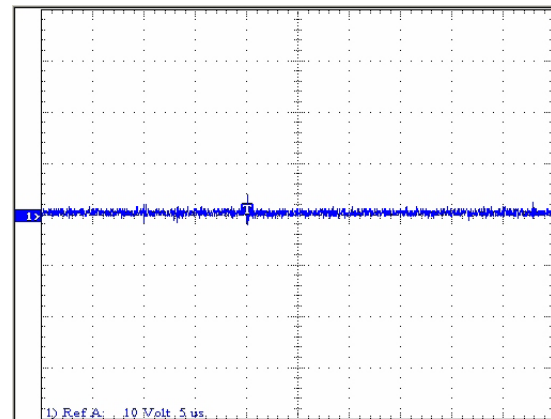
- Compact design
- Rugged spring loaded carbon brush
- Can be mounted externally or internally to the motor
- Currently being used on a number of custom installations



Custom application utilizing the Baldor shaft grounding brush under a protective cover.



Typical waveform of voltage spikes which can cause damaging effects to motor bearings.



Shaft voltage measurements of the Baldor motor with the shaft grounding brush installed shows no indication of shaft voltage discharge.

In some adjustable speed drive applications where high common mode voltages are present, capacitive discharge from the rotor to ground through the motor bearings may cause heavy frosting and eventually fluting in the bearings. A Baldor shaft grounding brush can provide a current path to ground and protect the bearings from damage.

For complete details, please contact your local Baldor•Reliance Sales Representative

**BALDOR**  
A MEMBER OF THE ABB GROUP

**Baldor Electric Company**  
P.O. Box 2400 • Fort Smith, AR 72902-2400 U.S.A.  
Phone (479) 646-4711 • Fax (479) 648-5792

[www.baldor.com](http://www.baldor.com)

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# Backdraft Damper for Air Handlers with FANWALL TECHNOLOGY®

Model FBD



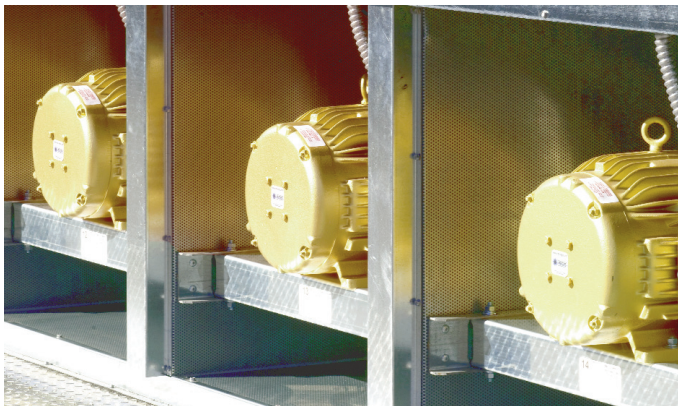
**t Temtrol®**

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*Delivering Quality One Unit at a Time*



# New Backdraft Control Device



## Why Temtrol

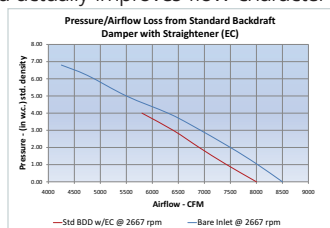
Since 1955, Temtrol, LLC. has earned a reputation for the manufacturing of innovative custom air handling equipment of the highest quality for commercial, institutional, and industrial applications. When you seek a manufacturer with flexibility in construction, products designed for long life, and one that delivers performance without compromise, specify Temtrol®.

## Revolutionary Backflow Control Device

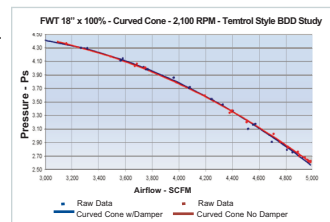
Air handlers are critical components in a building's air conditioning system. The redundancy of fan components in a multi-fan array adds to an air-handling unit's reliability. If you were to disable a fan or fans in a FANWALL® system during operation, how would you handle the backflow of air that would occur? The answer is the new patent pending model FBD backdraft damper.

The model FBD backdraft damper has a revolutionary new blade profile that laminarizes incoming air and actually improves flow characteristics. To illustrate this advantage, Graph 1 shows the significant system effect penalty associated with the addition of typical backdraft dampers (blue top line represents without damper, red bottom line represents with damper).

In striking contrast, Graph 2 illustrates the model FBD backdraft damper, which amazingly imposes near ZERO net effect on the system. The resulting performance of this remarkable new innovation is truly nothing short of revolutionary!



Graph 1 - Traditional backdraft damper system effect impact shown in red line.

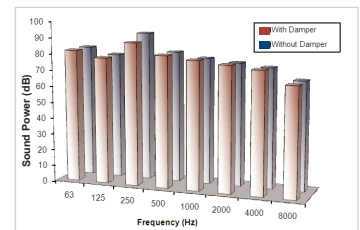


Graph 2 - Model FBD backdraft damper performance showing near zero system effect impact.

## Acoustical Benefits

This laminarizing effect has a significant impact on the acoustical performance of the system as well.

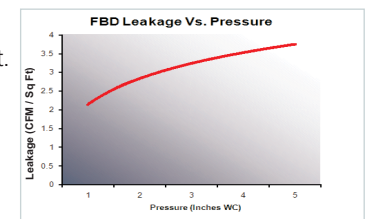
Graph 3 shows the acoustical comparison between a FANWALL cube using a FBD backdraft damper and again with a conventional backdraft damper. The acoustical performance is either essentially identical or significantly improved in every band.



Graph 3 - Sound comparison, by octave band, of FANWALL cube with model FBD backdraft damper (red front bars) and without backdraft damper (blue back bars).

## Low Leakage Performance

The new model FBD backdraft damper has a "world class" low leakage rate of only two cfm/sq. ft. at one-inch of static pressure. This far exceeds requirements for a 1A class rating for control dampers. It is also nearly **nine times** less than the industry standard backdraft damper, which has a reported leakage of 17.5 cfm/sq. ft. at the same static pressure!

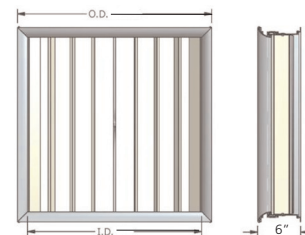


Graph 4 - Model FBD leakage rate test showing low leakage.

## Important Features

- Non-corrosive extruded aluminum frame and blades
- Santoprene blade seals
- Low friction sealed metal ball bearings for long life and continuous operation

## Three Sizes Cover Every Application



Model	Wheel / Cone Size							O.D.	I.D.	MAX TSP
	10"	12"	14"	16"	18"	20"	22"			
FBD-4	X							14.75	12"	12"
FBD-6		X	X	X				20.75	18"	12"
FBD-8					X	X	X	26.75	24"	12"

Contact your local CES Group Representative to learn more about the model FBD backdraft damper.

Patent pending. FANWALL® and FANWALL TECHNOLOGY® are registered trademarks of HUNTAIR, Inc. Temtrol, LLC has a policy of continuous product improvement and reserves the right to change design and specifications without notice.



www.temtrol.com  
temtrol@temtrol.com

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TEMT-FBD-SB-1A  
DEC 2010



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# Motor Overload Panel

Panel options for FANWALL® systems



**t** **Temtrol**®

*Delivering Customer Satisfaction One Unit At A Time*

# Temtrol Air Handlers

*Motors for FANWALL® systems are wired to a factory furnished manual starter overload panel—standard for individual motor overload protection.*

## Standard Panel

- ❶ NEMA 4, UL listed enclosure is constructed of cold rolled 16 gauge steel (14 gauge if 36"H x 30"W or larger) that is dip-coated primed and powder coated.
- ❷ Panel is provided with carbon steel hinges, foamed-in-place gasket and zinc-plated back plate.
- ❸ ■ Power block for VFD output wiring.  
■ Auxiliary contacts wired in series (parallel option) for optional field wiring to a remote powered pilot light or alarm.  
■ IECC manual starters with rotary type operator with lock-out tag-out feature.

## Optional Features

- ❹ ■ Two or more power blocks provided for split power feed panels. Each feed is controlled by a separate VFD.
- ❺ ■ Use of current switches in lieu of aux contacts for optional field wiring to a remote powered pilot light or alarm.
- ❻ ■ Magnetic contactor(s) for remote "ON/OFF" fan control.
- ❼ Cover mounted pilot lights for local monitoring. Single and multiple pilot light options are available.
- ❽ Pilot lights can be configured for "RUN" or "FAULT" status indication.
- ❾ Input power disconnect(s) with cover mounted switch operator handle(s).



## CD50 LOW LEAKAGE CONTROL DAMPER

High Performance Extruded Aluminum Airfoil  
Class 1A Leakage Rated

### APPLICATION

The CD50 is a low leak, extruded aluminum damper designed with airfoil blades for higher velocity and pressure HVAC systems. It meets the leakage requirements of the International Energy Conservation Code by leaking **less than 3 cfm/sq. ft. at 1" of static pressure** and is AMCA licensed as a Class 1A damper.

### STANDARD CONSTRUCTION

#### FRAME

5" x 1" x 6063T5 extruded aluminum hat channel with .125" minimum wall thickness (127 x 25 x 3.2). Low profile, 5" x 1/2" (127 x 13) top and bottom frames on dampers 12" (305) high and less. Mounting flanges on both sides of frame.

#### BLADES

6" (152) wide, 6063T5 heavy gage extruded aluminum, airfoil shape.

#### SEALS

Ruskiprene blade edge seals and flexible metal compressible jamb seals.

#### BEARINGS

Molded synthetic.

#### LINKAGE

Concealed in frame.

#### AXLES

1/2" (13) plated steel hex.

#### MAXIMUM SIZE

Single section – 60"w x 72"h (1524 x 1829).

Multiple section assembly – Unlimited size.

#### MINIMUM SIZE

Single blade – 6"w x 5"h (152 x 127).

Two blades, parallel or opposed action: 6"w x 9"h (152 x 229).

#### TEMPERATURE LIMITS

### FEATURES

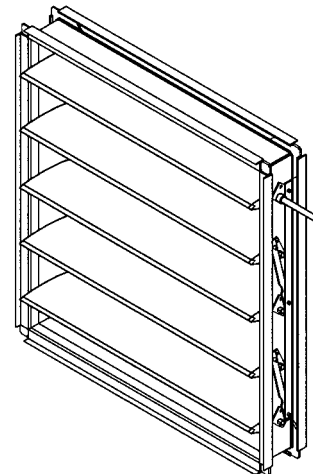
- Airfoil blade design for low pressure drop and less noise generation.
- Positive lock axles, noncorrosive bearings and shake proof linkage for low maintenance operation.
- Blade edge seals mechanically lock into the blade for superior sealing.

### OPTIONS

- Factory-installed, pneumatic and electric actuators.
- Enamel and epoxy finishes.
- SP100 Switch Package to remotely indicate damper blade position.
- 16 gage galvanized steel hat channel frame.
- Front, rear or double flange frame with or without bolt holes.
- Face and bypass configurations.

**NOTE:** Dimensions shown in parenthesis ( ) indicate millimeters.

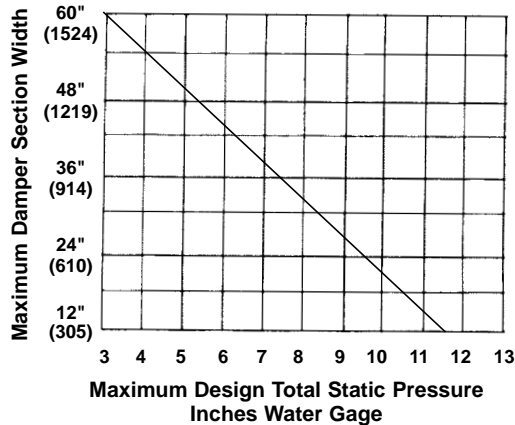
\*Units furnished approximately 1/4" (6) smaller than given opening dimensions.





# CD50 AMCA LICENSED PERFORMANCE DATA

## CD50 PRESSURE LIMITATIONS



The CD50 may be used in systems with total pressures exceeding 3.5" by reducing damper section width as indicated. Example: Maximum design total pressure of 8.5" w.g. would require CD50 damper with maximum section width of 36" (914).

Pressure limitations shown above allow maximum blade deflection of 1/180 of span on 60" (1524) damper widths. Deflections in other damper widths (less than 48" [1219]) at higher pressures shown will result in blade deflection substantially less than 1/180 of span.



Ruskin Company certifies that the CD50 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA International Certified Ratings Seal applies to Air Performance and Air Leakage.

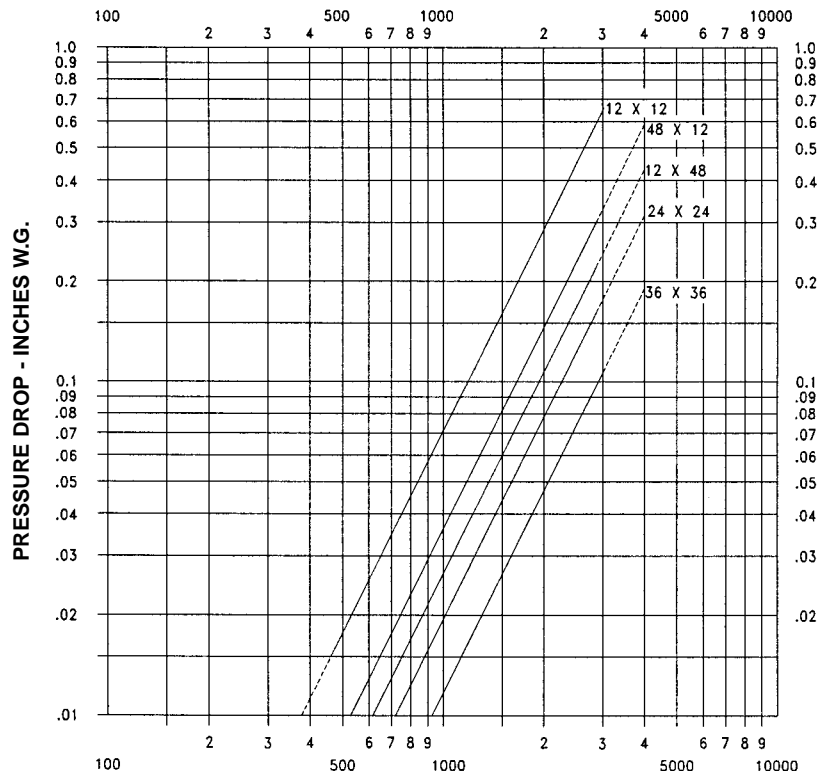
Pressure/ Class	Leakage, L/s/m <sup>2</sup> (ft <sup>3</sup> /min/ft <sup>2</sup> )			
	Required Rating		Extended Ranges (Opt.)	
	1" (0.25 kPa)	4" (1.0 kPa)	8" (2.0 kPa)	12" (3.0 kPa)
1A	3 (15.2)	N/A	N/A	N/A
1	4 (20.3)	8 (40.6)	11 (55.9)	14 (71.1)
2	10 (50.8)	20 (102)	28 (142)	35 (178)
3	40 (203)	80 (406)	112 (569)	140 (711)

DAMPER WIDTH (INCHES)	1 IN. W.G.	4 IN. W.G.	8 IN. W.G.
12" (305)	IA	I	II
24" (610)	IA	I	II
36" (914)	IA	I	NA
48" (1219)	IA	I	NA
60" (1524)	IA	I	NA

Leakage testing conducted in accordance with AMCA Standard 500-D-98. Torque applied holding damper closed, 5 in. lbs./sq. ft. on opposed blade dampers and 7 in. lbs./sq. ft. on parallel blade

dampers. Air leakage is based on operation between 50°F to 104°F. All data corrected to represent standard air density 0.075 lbs/ft<sup>3</sup>.

## VELOCITY VS. PRESSURE DROP



FACE VELOCITY - FEET/MINUTE  
AMCA FIG. 5.3

CD50 sizes 12 x 12, 24 x 24, 48 x 12, 12 x 48, 36 x 36 (305 x 305, 610 x 610, 1219 x 305, 305 x 1219, 914 x 914)

All data corrected to represent standard air at a density of 0.075 lbs/ft<sup>3</sup>.

SOUND RATINGS

CD50 SOUND RATINGS

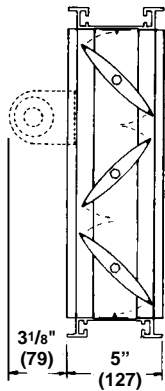
Damper Size	Damper Full Open		Damper 75% Open		Damper 50% Open		Damper 25% Open	
	CFM	NC	CFM	NC	CFM	NC	CFM	NC
12 x 12 (305 x 305)	2000	17	1500	11	1000	11	500	*
	3000	28	2250	22	1500	19	750	*
	4000	35	3000	29	2000	24	1000	*
18 x 18 (457 x 457)	2250	17	1688	10	1125	21	563	*
	4500	33	3375	26	2250	32	1125	*
	6750	43	5063	37	3375	40	1688	15
24 x 24 (610 x 610)	4000	11	3000	10	2000	26	1000	*
	8000	32	6000	30	4000	38	2000	21
	12000	43	9000	42	6000	46	3000	31

NC = Noise criteria in Decibels is based on 10db room effect and 10db of room attenuation.

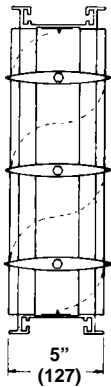
\* = Less than 10 NC

See ASHRAE Handbook (1977 Fundamentals, Chapter 7) for explanation of NC Ratings.

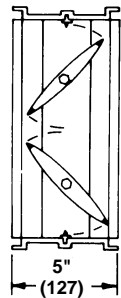
DIMENSIONAL INFORMATION



OPPOSED  
BLADE



PARALLEL  
BLADE



LOW PROFILE  
Standard construction  
for higher free area on  
dampers 12" (305) high  
and less.

CD50 SUGGESTED SPECIFICATION

Furnish and install, at locations shown on plans, or in accordance with schedules, Low leakage dampers shall meet the following minimum construction standards: Frames shall be 5" x 1" x .125" (minimum thickness) (127 x 25 x 3.2) 6063T5 extruded aluminum hat channel with hat mounting flanges on both sides of the frame. Each corner shall be reinforced with two die formed internal braces and machine staked for maximum rigidity. Blades shall be airfoil type extruded aluminum (maximum 6" [152] depth) with integral structural reinforcing tube running full length of each blade.

Blade edge seals shall be extruded double edge design with inflatable pocket which enables air pressure from either direction to

assist in blade to blade seal off. Blades seals shall be mechanically locked in extruded blade slots, yet shall be easily replaceable in field. Adhesive or clip-on type blade seals are not acceptable. Bearings shall be non-corrosive molded synthetic. Axles shall be hexagonal (round not acceptable) to provide positive locking connection to blades and linkage. Linkage shall be concealed in frame. Submittal must include leakage, maximum air flow and maximum pressure ratings based on AMCA Publication 500. Damper shall be tested and licensed in accordance with AMCA 511 for Air Performance and Air Leakage. Damper widths from 12" to 60" (305 to 1524) wide shall not leak any greater than 8 cfm sq. ft. @ 4" w.g. and a maximum of 3 CFM sq. ft. @ 1" w.g. Dampers shall be in all respects equivalent to Ruskin Model CD50.



Better Air is Our Business®

## AmericanAirFilter® Type A-8 Filter Holding Frames and Latches



Type A-8 Filter Holding Frames

### Type A-8 Filter Holding Frames

The Type A-8 filter holding frame comes in seven standard sizes that can be used individually or may be combined to fit virtually any size filter bank. Each frame includes closed cell gaskets to ensure a proper seal between the frame and filter to minimize dirty air bypass. Frames are also available without gaskets or with dovetail gaskets. Also available are Type A-8 latches designed to hold the filter in place and create a positive seal. Type A-8 frames are constructed of galvanized steel and 304 stainless steel, and also available in 316 stainless steel.

Size	Part Number 16 ga. Galv	Part Number 18 ga. 304SS
12 x 24 x 3	312-600-600	312-600-100
16 x 20 x 3	312-600-001	316-600-101
16 x 25 x 3	312-600-002	316-600-102
20 x 20 x 3	312-600-003	312-600-103
20 x 24 x 3	312-600-004	312-600-104
20 x 25 x 3	312-600-005	312-600-105
24 x 24 x 3	312-600-606	312-600-106

### Type A-8 Latches



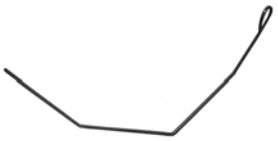



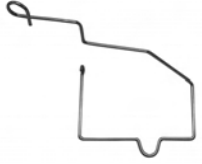


AAF offers a variety of Type A-8 latches to secure disposable panel filters or 12" box style high efficiency filters (with or without a prefilter) into a Type A-8 filter holding frame. The Type A-8 latches attach to one of two sets of knockouts on the Type A-8 frame. Simply attach the appropriate latch that best fits the depth of the filter. It is recommended to use 4 latches per frame.

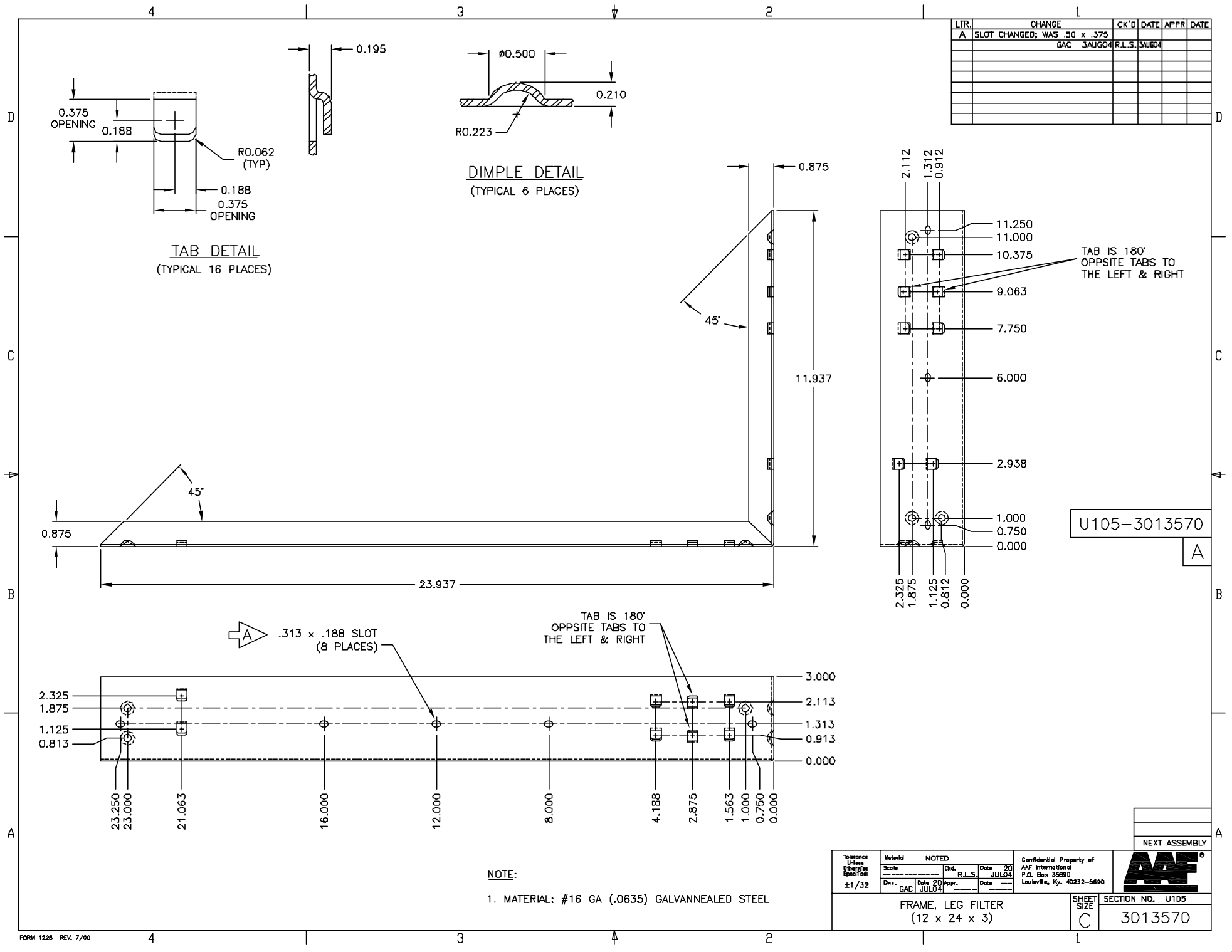
AAF Part Number	Material	Application	Farr Model	Picture
315-004-000	Galvanized Steel	Secures a 4" filter, or a 2" filter with a single header filter in an A-8 frame	C-86	
315-004-100	Stainless Steel	Secures a 4" filter, or a 2" filter with a single header filter in an A-8 frame	C-86S	
315-004-001	Galvanized Steel	12" spring latch with 7/8" Tang to secure 12" deep double header AAF filter	C-80	

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# AmericanAirFilter®

## Type A-8 Filter Holding Frames and Latches

AAF Part Number	Material	Application	Farr Model	Picture
315-004-101	Stainless Steel	12" spring latch with 7/8" Tang to secure 12" deep double header AAF filter	C-80S	
315-004-002	Galvanized Steel	6" spring latch with 7/8" Tang to secure 6" deep double header AAF filter	C-90	
315-004-003	Stainless Steel	Secures a 1" or 2" prefilter or a single header filter in an A-8 frame	C-70S	
315-004-006	Galvanized Steel	Secures a 4" prefilter in same frame with a single header filter	C-89	
315-004-106	Stainless Steel	Secures a 4" prefilter in same frame with a single header filter	C-89S	
315-004-007	Galvanized Steel	2" deep filter as a prefilter to a single header filter	C-77	
315-004-107	Stainless Steel	2" deep filter as a prefilter to a single header filter	C-77S	
315-003-002	Galvanized Steel	Holds a 2" prefilter on the face of a double header AAF filter	N/A	
315-003-004	Galvanized Steel	Holds a 4" prefilter on the face of a double header AAF filter	N/A	

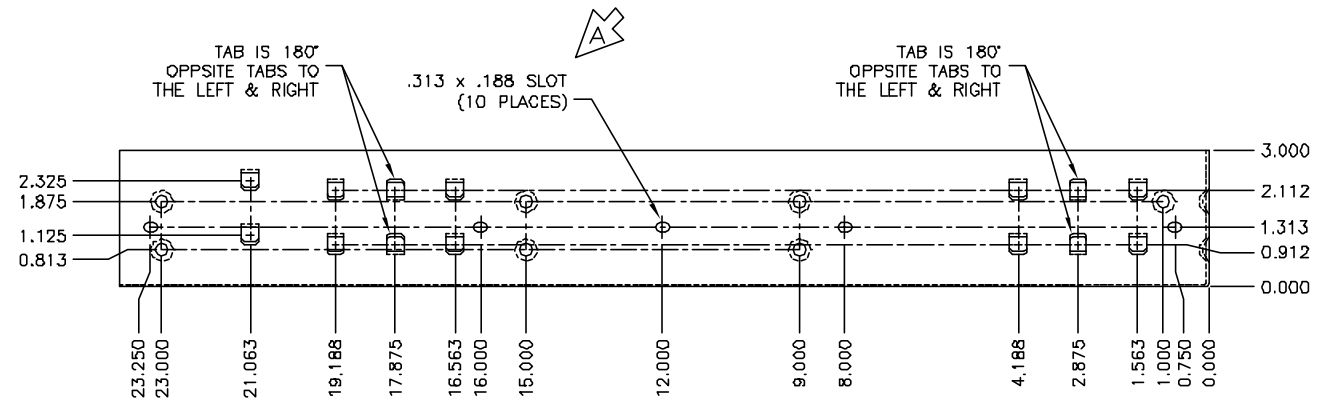



LTR.	CHANGE	CK'D	DATE	APPR	DATE
A	SLOT CHANGED; WAS .50 x .375 GAC 3AUG04	R.L.S.	3AUG04		

U105-3013570  
A

NOTE:  
1. MATERIAL: #16 GA (.0635) GALVANNEALED STEEL

Tolerance Unless Otherwise Specified ±1/32	Material	NOTED	Confidential Property of AAF International P.O. Box 35690 Louisville, Ky. 40232-5690	<b>AAF</b> <sup>®</sup>
	Scale	Drawn GAC		
FRAME, LEG FILTER (12 x 24 x 3)			SHEET SIZE C	SECTION NO. U105 3013570



Tolerance Unless Otherwise Specified  ±1/32	Material <b>NOTED</b>				Confidential Property of AMF International P.O. Box 35600 Louisville, Ky. 40232-5600	
	Scale		Cast	Date 20 JUL04		
	Dim.	Date 20 JUL04	Appr.	Date		
	GAC				SHEET NO. U105	
FRAME, LEG FILTER (24 x 24 x 3)						
SIZE D					SECTION NO. U105 3013588	

SHEET SIZE	SECTION NO. U105
	3013588



**AmericanAirFilter®**

**PerfectPleat® HC M8**  
**PerfectPleat®**

*1" and 2" Extended Surface,  
Pleated Filter with  
Process-Controlled Quality*

*With DuraFlex® Media*

*Better Air is Our Business®*



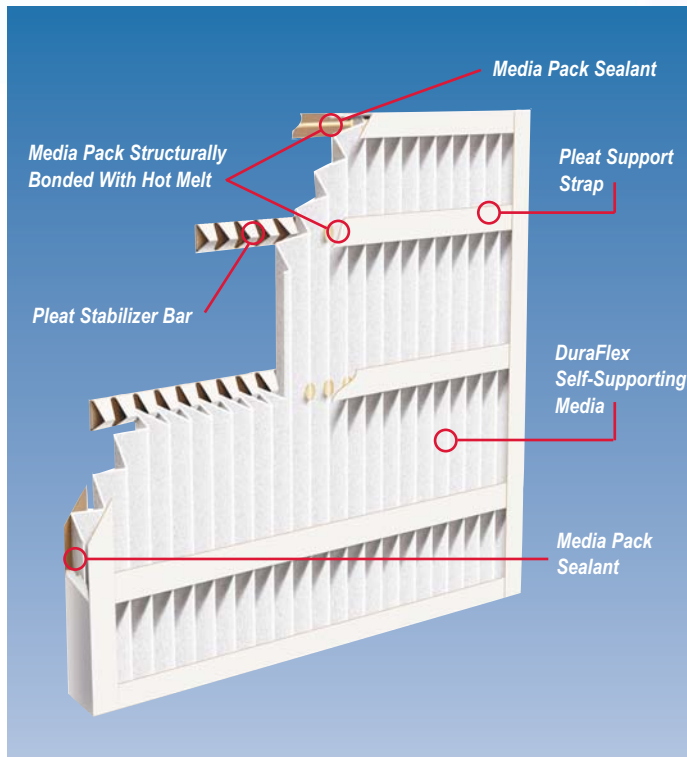
**AmericanAirFilter®**

## **PerfectPleat® HC M8 - MERV 8**

### **PerfectPleat® - MERV 7**

***Extended Surface, Pleated Filter  
with Process-Controlled Quality***

- **Mechanical efficiency** — does not rely on electret charge technology
- **Form and fit unlike any other pleat available today**
- **Self-supporting DuraFlex® media made from virgin fiber; no wire support needed**
- **Consistent media with controlled fiber size and blend**
- **High capacity model, PerfectPleat HC M8, available for applications where higher efficiencies, airflow, and longer life are important**
- **Available in 1", 2" and 4" models**
- **Patented media, filter design, and manufacturing process. Patents covered under one or more of the following**  
US 6398839 B2; US 6254653 B1; US 6159318; US 6165242;  
US 6387140 B1 (1" model only)



*PerfectPleat 2" Construction*

### ***The Air Filtration Leader***

AAF International, one of the world's largest manufacturers of air filtration products, is known for technical innovation and excellence. Designed, developed, and patented by AAF, the PerfectPleat is a product with form and fit unlike any other pleated filter in the marketplace today. In addition, the PerfectPleat has the filtering efficiency you need and expect.

### ***Superior Design and Construction***

Drawing on years of experience in manufacturing quality air filters, AAF has created a state-of-the-art process for producing pleated filters. The extremely high quality of these filters is a result of three unique innovations: a new, automated manufacturing process; a unique, self-supporting media; and a filter construction that provides incredible strength without wire support.

Since their introduction, pleated filters have become a larger and more important segment of the filtration marketplace. However, conventional design and process are not conducive to the manufacture of consistently pleated media packs or finished filters. Inconsistency in pleat arrangement, variations in media, improper bonding of media to frame, along with antiquated manufacturing techniques, have a negative impact on efficiency, resistance, durability, and strength. The automated and controlled process AAF has developed for the PerfectPleat eliminates these inconsistencies and irregularities. Our automated manufacturing process offers consistency unmatched by conventionally manufactured pleats.

### ***DuraFlex® Media - Patented Media Design***

Uniform size virgin fibers are assembled in closely controlled blends to create a media that is both self-supporting and remarkably consistent in performance. When pleated, DuraFlex will hold its shape without the wire support characteristic of conventional pleated filters. That means no potential for the formation of rust and safer handling - no nicks or cuts for the installer or handler.

With the superior resiliency of DuraFlex media and no need for wire support, the PerfectPleat can sustain significant abuse and maintain its shape and pleat spacing. The absence of the wire also makes the filter totally incinerable, which simplifies disposal. The PerfectPleat meets or exceeds all current expectations for service life.



*As a result of its unique design, PerfectPleat can withstand significant damage.*



*DuraFlex media has "memory" which allows PerfectPleat to remain functional, even when the frame has been compromised.*

\* See brochure AFP-1-206 for 4" model.



### Increasing Efficiency — Throughout Life of the Filter

PerfectPleat is designed to consistently increase its efficiency throughout the service life of the filter. Competitive pleated panel filters, manufactured using an electret charge to obtain the MERV 8 rating, perform with declining efficiency over time. PerfectPleat HC M8 and PerfectPleat have initial MERV 8 and MERV 7 ratings respectively, but the efficiency increases significantly when dust loading begins.

### Applications

PerfectPleat's self-supporting characteristics allow a pleating pattern that promotes airflow and maximizes dust holding capacity (DHC). The PerfectPleat HC M8 is ideal for applications where pleated filters are currently in use and higher efficiencies are required or desired. PerfectPleat is best suited for standard capacity pleated filter applications. Heavy Duty (HD) PerfectPleat is available for applications where extremely low temperature and high airflow are present. See Brochure AFP-1-201. Every PerfectPleat offers superior durability and performance when properly installed and maintained.



### Environmentally Responsible Air Filtration Solutions

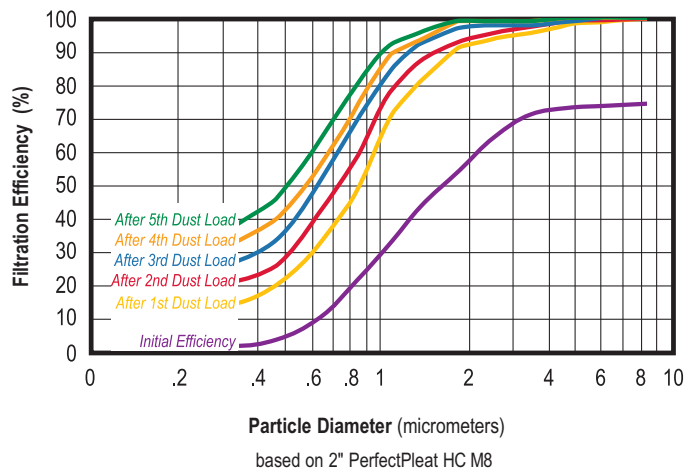
AAF International is committed to operating with a goal of sustainability. We have implemented several initiatives to work and manufacture in an environmentally responsible manner and contribute more to protecting our planet by using fewer natural resources and reducing our carbon footprint. AAF's PerfectPleat product design minimizes base raw material consumption and meets our "Green" product development standards. The PerfectPleat product line is totally incinerable and the absence of support wire simplifies disposal. Used during construction, PerfectPleat HC M8 may contribute to LEED® certification points under IEQ categories.

### 2" PerfectPleat — Heavy Duty Frame

The perimeter frame of the PerfectPleat HC M8 and PerfectPleat is constructed from the highest wet-strength 28 pt. beverage carrier board available, securely bonded to the media pack. The 28 pt. thickness improves filter strength and helps resist damage.

Uniquely designed pleat stabilizers are bonded to the media on the air leaving side to ensure uniform pleat spacing and provide additional strength. On the air-entering side, support straps add to the PerfectPleat's rigidity. The support straps and pleat stabilizers ensure integrity against turbulent airflow and provide excellent lateral stability for installation in side-access systems.

### Particle Size Efficiency Curves

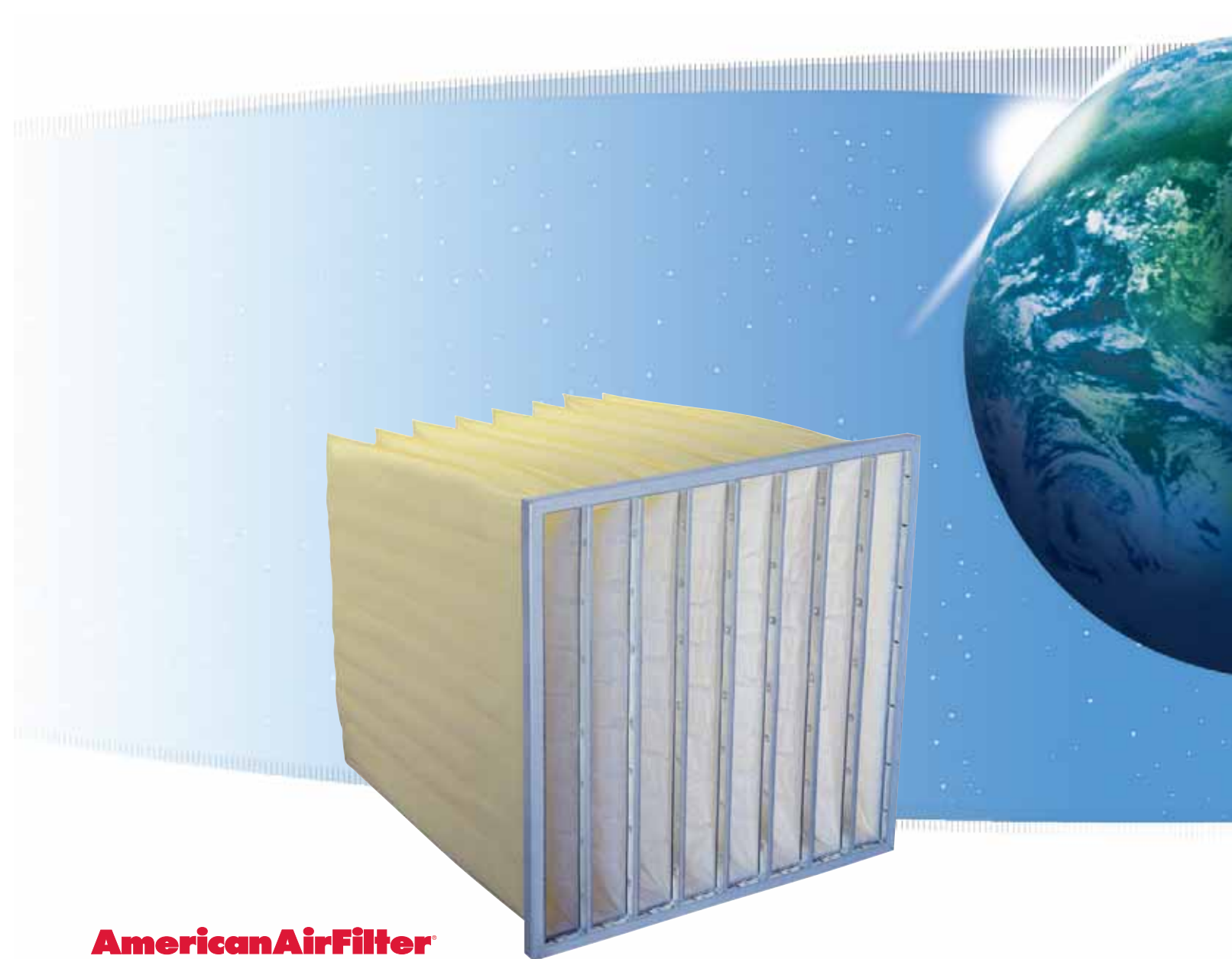


### 1" PerfectPleat — Strength and Durability

The 1" PerfectPleat HC M8 and PerfectPleat have the same durability and performance as the 2" models. Both are made using DuraFlex media encased in a 28 pt. beverage carrier board frame. PerfectPleat 1" models feature a perimeter frame, with three supporting straps on the air entering and air leaving sides of the filter. Both models resist crushing and abuse and can be used in any application where 1" filters are currently in place. PerfectPleat HC M8 is rated MERV 8 and PerfectPleat rates MERV 7.



PerfectPleat HC M8, 1" thick, air leaving side. A blue stripe designates PerfectPleat HC M8 media.



**AmericanAirFilter®**  
**DriPak® 2000**

*Synthetic Extended Surface  
Pocket Filters*

*Available with Antimicrobial*

*Better Air is Our Business®* **AAF**  
INTERNATIONAL

## DriPak® 2000

### *Extended Surface Pocket Filters with Layered, Meltblown Synthetic Media*

- *High-loft, layered, meltblown synthetic media improves performance*
- *Ultrasonically-welded pocket spacers and edges*
- *Available in four efficiencies:  
MERV 15 (90-95%\*), MERV 14 (80-85%\*),  
MERV 12 (60-65%\*) and MERV 8 (40-45%\*)*
- *Available with antimicrobial*

### **DriPak® 2000**

Designed for high performance in demanding operating conditions, ultrasonically-welded DriPak 2000 extended surface pocket filters can function as prefilters or final filters where clean air is a necessity.

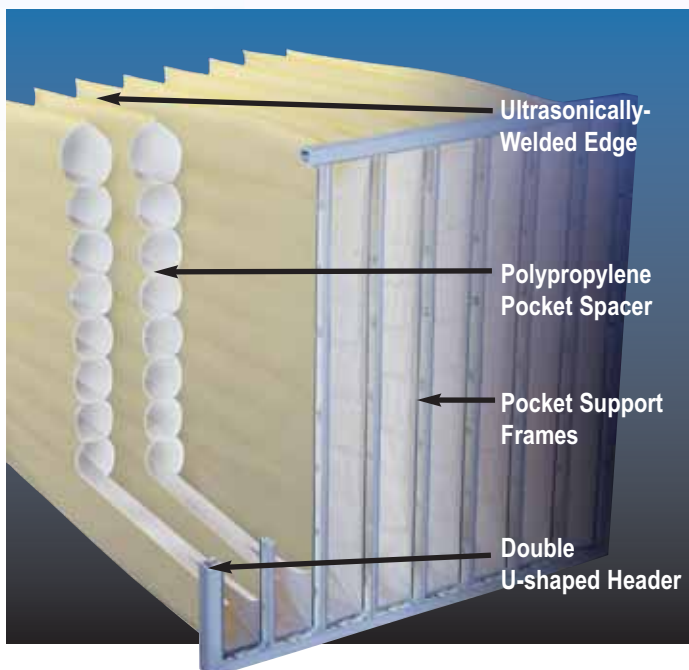
DriPak 2000 filters are ideal for healthcare facilities, automotive paint booths, commercial buildings, and a variety of industrial applications. Designed and manufactured by AAF International, pioneers in extended surface pocket filters, the ultrasonically-welded DriPak 2000 raises the industry standard for value and performance.

#### **Now Better Than Ever**

Today's DriPak 2000 features a unique, ultrasonically-welded pocket configuration that guarantees complete pocket inflation and eliminates crowding or leakage. Reinforced pocket support frames eliminate flexing or buckling, even in a turbulent operating environment.

The DriPak 2000 is available in four efficiencies, MERV 15, MERV 14, MERV 12, and MERV 8 to meet the requirements of your HVAC system.

DriPak 2000 with antimicrobial is designed specifically to improve Indoor Air Quality (IAQ). Air filters trap and concentrate particulate air contaminants including viable fungal and bacterial spores. The presence of the antimicrobial preservative in the filter media is intended to preserve the integrity of the media throughout the useful life of the filter. Antimicrobial preservatives are not meant to increase the efficiency of the filter, nor to kill microorganisms "on the fly" as they pass through a filter.

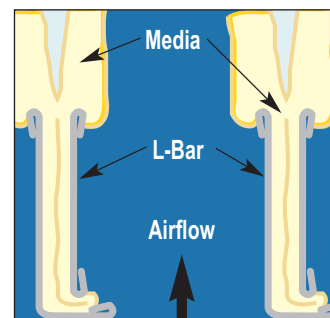


### **IAQ Engineered**

The DriPak 2000 is made from layered, meltblown synthetic media protected by a scrim on the air leaving side. Layering the media provides both a high efficiency final filter layer that effectively filters fine particulate and an integral lofted prefilter layer that captures larger particulate. Meltblown synthetic media is stronger than fiberglass, non-shedding, and is water resistant.

### **Designed for Performance**

DriPak 2000 employs a sturdy pocket design that includes ultrasonic welding to ensure leak-free pockets. Interlocked support frames attached to the pockets prevent flexing and buckling during full inflation. The double U-shaped, reinforced header forms a solid container for the pocket support frames.

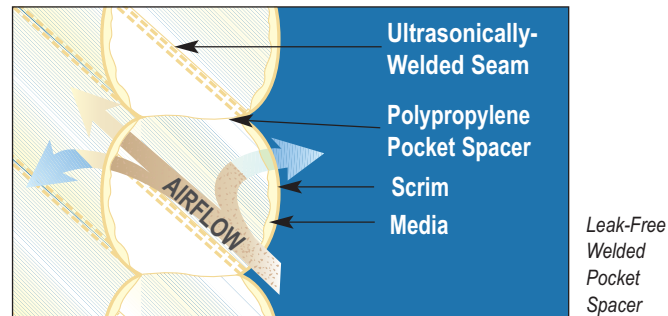
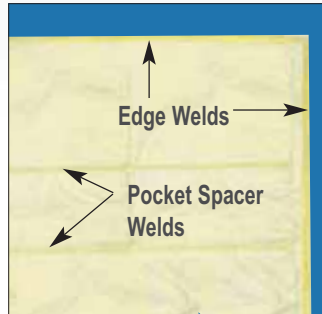


*Interlocked Pocket Support Frames*

## Ultrasonically-Welded Pocket Construction

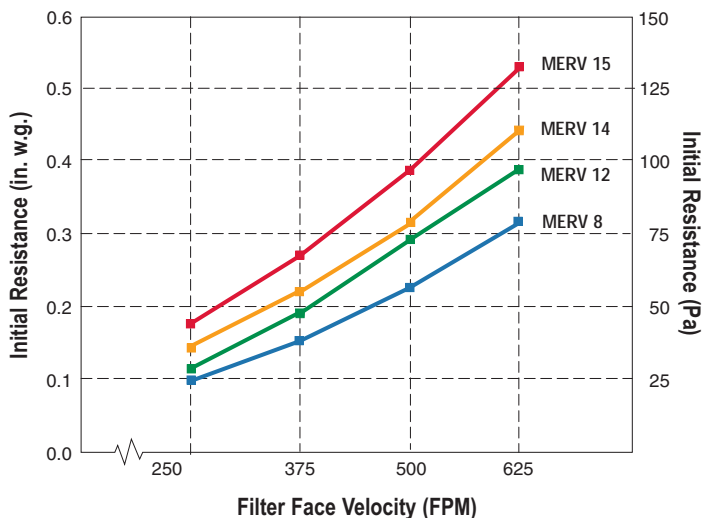
The DriPak 2000 ultrasonically-welded pocket construction features ribbons of fabric sealed inside the pockets to create aerodynamic channels. This eliminates the needle holes associated with span stitching.

The contoured shape of the pocket allows full inflation without crowding or restricting airflow to ensure full media utilization and long service life.

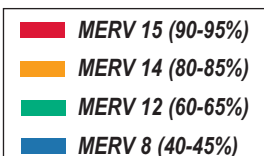


## Operating Data

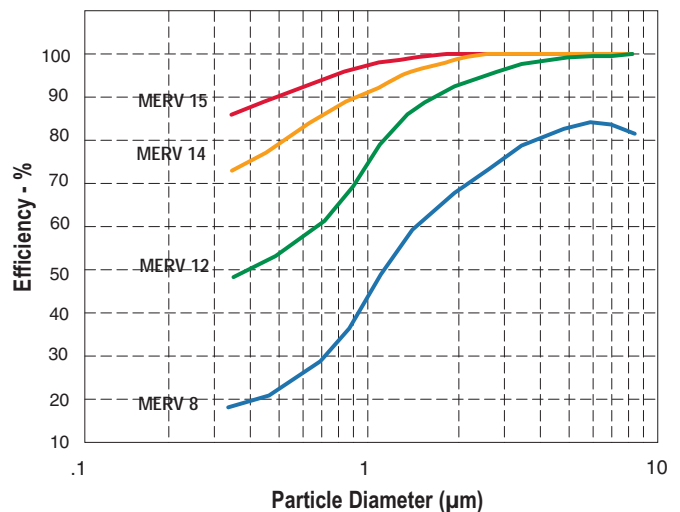
Initial Resistance vs. Airflow



MERV 15, 14 & 12 based on 24" x 24" x 30" - 8 pocket filter.  
 MERV 8 based on 24" x 24" x 19" - 6 pocket filter.



Minimum Composite Efficiency  
 Efficiency vs. Particle Size



Tested in accordance with ASHRAE Test Standard 52.2.  
 This chart shows the minimum efficiency the filter will provide throughout its service life.



## DriPak® 2000

Nominal Size (Inches) (W x H x D)	Pockets Per Filter	Rated Airflow Capacity (CFM) By			Gross Media Area (sq. ft.)	*Rated Initial Resistance (in. w.g.)			
		* Rated Filter Face Velocity:				Average Efficiency:			
						MERV 15	MERV 14	MERV 12	MERV 8
		375 FPM	500 FPM	625 FPM		90-95%	80-85%	60-65%	40-45%
Recommended final resistance is 1.0" w.g. for all models.									
24 x 24 x 36	9			2500	117	.53	.48	.44	--
24 x 24 x 36	8		2000		104	.31	.29	.27	--
24 x 24 x 36	7		2000		91	.34	.30	.29	--
24 x 24 x 36	6		2000		78	.35	.31	.29	--
24 x 20 x 36	6		1675		66	.37	.31	.31	--
20 x 24 x 36	6			2075	78	.44	.41	.35	--
20 x 24 x 36	5		1675		65	.37	.31	.31	--
20 x 20 x 36	5		1400		58	.37	.31	.31	--
12 x 24 x 36	4		1000	1250	52	.41	.37	.35	--
12 x 24 x 36	3		1000		39	.35	.31	.29	--
24 x 24 x 30	10		2000		107	.42	.34	.34	--
24 x 24 x 30	8		2000		85	.38	.32	.29	--
24 x 24 x 30	6		2000		64	.43	.36	.31	--
24 x 20 x 30	6		1675		54	.46	.37	.31	--
20 x 24 x 30	6		1675		64	.40	.36	.30	--
20 x 24 x 30	5		1675		53	.46	.37	.34	--
20 x 20 x 30	6		1400		57	.41	.32	.29	--
12 x 24 x 30	5		1000		53	.42	.34	.34	--
12 x 24 x 30	4		1000		43	.38	.32	.29	--
12 x 24 x 30	3		1000		32	.43	.36	.31	--
24 x 24 x 21	10		2000		75	.55	.41	.38	--
24 x 24 x 21	8		2000		60	.54	.42	.33	--
24 x 24 x 21	6	1500			45	.48	.37	.27	--
24 x 20 x 21	8		1675		53	.50	.37	.34	--
24 x 20 x 21	6	1250			40	.38	.28	.21	--
20 x 24 x 21	6		1675		45	.58	.47	.35	--
20 x 24 x 21	5	1250			37	.49	.38	.31	--
20 x 20 x 21	6		1400		38	.52	.35	.30	--
20 x 20 x 21	5	1050			33	.43	.26	.22	--
12 x 24 x 21	5		1000		37	.55	.41	.38	--
12 x 24 x 21	4		1000		30	.54	.42	.33	--
12 x 24 x 21	3	750			22	.48	.37	.27	--
24 x 24 x 19	6			2500	42				.32
24 x 20 x 19	6			2075	37	--	--	--	.32
20 x 24 x 19	5			2075	35	--	--	--	.32
20 x 20 x 19	5			1750	30	--	--	--	.32
12 x 24 x 19	3			1250	21	--	--	--	.32
24 x 24 x 15	10	1500			53	.49	.37	.31	--
24 x 24 x 15	8		2000		43	--	--	--	.25
24 x 24 x 15	6	1500			32	.68	.50	.34	--
24 x 20 x 15	6		1675		29	--	--	--	.25
20 x 24 x 15	5		1675		28	--	--	--	.25
20 x 20 x 15	5		1400		24	--	--	--	.25
12 x 24 x 15	5	750			27	.49	.37	.31	--
12 x 24 x 15	3	750			16	.68	.50	.34	--
12 x 24 x 15	3		1000		17	--	--	--	.25
24 x 24 x 12	6		2000		27	--	--	--	.27
24 x 20 x 12	6		1675		24	--	--	--	.27
20 x 25 x 12	6		1750		27	--	--	--	.27
20 x 24 x 12	5		1675		22	--	--	--	.27
20 x 20 x 12	5		1400		19	--	--	--	.27
16 x 25 x 12	5		1400		23	--	--	--	.27
16 x 20 x 12	4		1100		15	--	--	--	.27
12 x 24 x 12	3		1000		13	--	--	--	.27

\*All performance data is based on the ASHRAE 52.2 and ASHRAE 52.1 test methods. Performance tolerances conform to Section 7.4 of ARI Standard 850-93.

**Gaskets and Loops** — Gaskets, for side access systems or other applications which require gaskets, and pocket support loops are available on all DriPak 2000 filters.

**Classifications** — DriPak 2000 filters are classified UL Class 1 and Class 2. Testing was performed according to UL Standard 900 and CAN 4-S111.

**Temperature Limits** — DriPak 2000 filters, operating with fan on, are designed for a continuous operating temperature of 200° F or 93° C.



# PerfectPleat® HC M8 -MERV 8

## PerfectPleat® -MERV 7

### Product Information Standard Sizes

Nominal Sizes (Inches) (W x H x D)	Actual Sizes (Inches) (W x H x D)	Rated Airflow Capacity (SCFM)			Pleats Per Filter			
		300 FPM	500 FPM	625 FPM	PerfectPleat HC M8 1"	PerfectPleat 1"	PerfectPleat HC M8 2"	PerfectPleat 2"
10 x 10 x 1	9 1/2 x 9 1/2 x 3/4	200	350		11	11		
10 x 20 x 1	9 1/2 x 19 1/2 x 3/4	400	700		11	11		
12 x 12 x 1	11 1/2 x 11 1/2 x 3/4	300	500		14	14		
12 x 20 x 1	11 1/2 x 19 1/2 x 3/4	500	850		14	14		
12 x 24 x 1	11 3/8 x 23 3/8 x 3/4	600	1000		14	14		
14 x 20 x 1	13 1/2 x 19 1/2 x 3/4	600	1000		16	16		
14 x 25 x 1	13 1/2 x 24 1/2 x 3/4	750	1200		16	16		
15 x 20 x 1	14 1/2 x 19 1/2 x 3/4	650	1050		17	17		
16 x 16 x 1	15 1/2 x 15 1/2 x 3/4	550	900		19	19		
16 x 20 x 1	15 1/2 x 19 1/2 x 3/4	650	1100		19	19		
16 x 25 x 1	15 1/2 x 24 1/2 x 3/4	850	1400		19	19		
18 x 20 x 1	17 1/2 x 19 1/2 x 3/4	750	1250		21	21		
18 x 24 x 1	17 3/8 x 23 3/8 x 3/4	900	1500		21	21		
18 x 25 x 1	17 1/2 x 24 1/2 x 3/4	950	1550		21	21		
20 x 20 x 1	19 1/2 x 19 1/2 x 3/4	850	1400		24	24		
20 x 25 x 1	19 1/2 x 24 1/2 x 3/4	1050	1750		24	24		
24 x 24 x 1	23 3/8 x 23 3/8 x 3/4	1200	2000		29	29		
25 x 25 x 1	24 1/2 x 24 1/2 x 3/4	1300	2200		30	30		
10 x 20 x 2	9 1/2 x 19 1/2 x 1 3/4	400	700	850			11	8
12 x 20 x 2	11 1/2 x 19 1/2 x 1 3/4	500	850	1050			14	10
12 x 24 x 2	11 3/8 x 23 3/8 x 1 3/4	600	1000	1250			14	10
14 x 25 x 2	13 1/2 x 24 1/2 x 1 3/4	750	1200	1500			16	11
15 x 20 x 2	14 1/2 x 19 1/2 x 1 3/4	650	1050	1300			17	12
15 x 25 x 2	14 1/2 x 24 1/2 x 1 3/4	800	1300	1650			17	12
16 x 16 x 2	15 1/2 x 15 1/2 x 1 3/4	550	900	1100			19	13
16 x 20 x 2	15 1/2 x 19 1/2 x 1 3/4	650	1100	1400			19	13
16 x 24 x 2	15 3/8 x 23 3/8 x 1 3/4	800	1350	1650			19	13
16 x 25 x 2	15 1/2 x 24 1/2 x 1 3/4	850	1400	1750			19	13
18 x 25 x 2	17 1/2 x 24 1/2 x 1 3/4	950	1550	1950			21	15
18 x 24 x 2	17 3/8 x 23 3/8 x 1 3/4	900	1500	1900			21	15
20 x 20 x 2	19 1/2 x 19 1/2 x 1 3/4	850	1400	1750			24	17
20 x 24 x 2	19 3/8 x 23 3/8 x 1 3/4	1000	1650	2100			24	17
20 x 25 x 2	19 1/2 x 24 1/2 x 1 3/4	1050	1750	2150			24	17
24 x 24 x 2	23 3/8 x 23 3/8 x 1 3/4	1200	2000	2500			29	20
25 x 25 x 2	24 1/2 x 24 1/2 x 1 3/4	1300	2150	2700			30	21

PerfectPleat and PerfectPleat HC M8 filters are classified UL Class 2. Testing was performed according to UL Standard 900 and CAN 4-S111.

### Performance Data

Filter	Pleats Per Lineal Foot	Rated Initial Resistance (in. w.g.)			Recommended Final Resistance (in. w.g.)	ASHRAE 52.2 MERV	Continuous Operating Temperature Limits	
		300 FPM	500 FPM	625 FPM			°F	°C
PerfectPleat HC M8 2"	15.0	.16	.33	.43	1.0	8	170°	77°
PerfectPleat 2"	10.0	.14	.30	.45	1.0	7	170°	77°
PerfectPleat HC M8 1"	15.0	.31	.62	----	1.0	8	170°	77°
PerfectPleat 1"	15.0	.20	.48	----	1.0	7	170°	77°



10300 Ormsby Park Place Suite 600  
Louisville, Kentucky 40223-6169

www.aafintl.com  
Customer Service 888.AAF.2003  
Fax 888.223.6500



AAF has a policy of continuous product research and improvement and reserves the right to change design and specifications without notice.

ISO Certified Firm

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Series  
2000

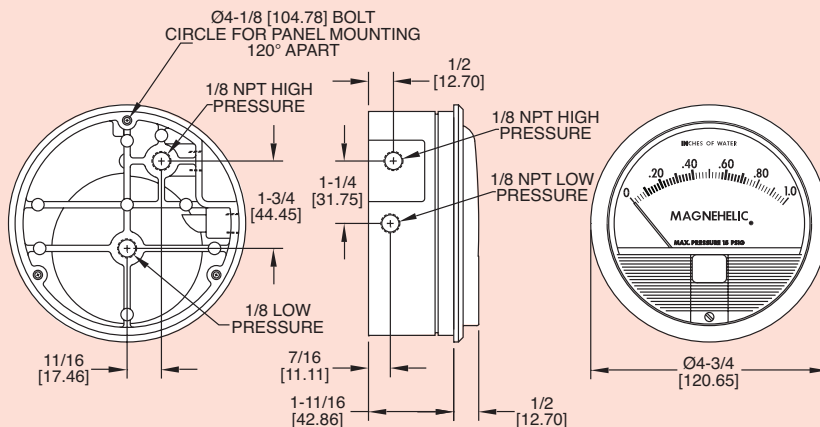
# Magnehelic® Differential Pressure Gages

Indicate Positive, Negative or Differential, Accurate within 2%



Patent Nos. 4,030,365  
5,012,678

Standard Magnehelic® Pressure Gage has a large, easy-to-read 4" dial.



Dimensions, Standard Series 2000 Magnehelic® Pressure Gages.  
(Slightly different on medium and high pressure models)

Select the Dwyer® Magnehelic® gage for high accuracy – guaranteed within 2% of full scale – and for the wide choice of 81 models available to suit your needs precisely. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates low air or non-corrosive gas pressures – either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too.

The Magnehelic® gage is the industry standard to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment.

**Note:** May be used with Hydrogen. When ordering a Buna-N diaphragm pressures must be less than 35 psi.

**MOUNTING.** A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. With the optional A-610



Flush ...Surface...or Pipe Mounted

Pipe Mounting Kit they may be conveniently installed on horizontal or vertical 1/4" - 2" pipe. Although calibrated for vertical position, many ranges above 1" may be used at any angle by simply re-zeroing. However, for maximum accuracy, they must be calibrated in the same position in which they are used. These characteristics make Magnehelic® gages ideal for both stationary and portable applications. A 4/16" hole is required for flush panel mounting. Complete mounting and connection fittings plus instructions are furnished with each instrument.

## VENT VALVES

In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.

## HIGH AND MEDIUM PRESSURE MODELS

Installation is similar to standard gages except that a 4/16" hole is needed for flush mounting. The medium pressure construction is rated for internal pressures up to 35 psig and the high pressure up to 80 psig. Available for all models. Because of larger case, the medium pressure and high pressure models will not fit in a portable case size. Installation of the A-321 safety relief valve on standard Magnehelic® gages often provides adequate protection against infrequent overpressure.



## SPECIFICATIONS

**Service:** Air and non-combustible, compatible gases. (Natural Gas option available.)

**Wetted Materials:** Consult factory.

**Housing:** Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.

**Accuracy:** ±2% of full scale (±3% on -0, -100 Pa, -125 Pa, 10MM and ±4% on -00, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).

**Pressure Limits:** -20" Hg. to 15 psig.† (-0.677 bar to 1.034 bar); MP option: 35 psig (2.41 bar), HP option: 80 psig (5.52 bar).

**Overpressure:** Relief plug opens at approximately 25 psig (1.72 bar), standard gages only.

**Temperature Limits:** 20 to 140°F\* (-6.67 to 60°C).

**Size:** 4" (101.6 mm) Diameter dial face.

**Mounting Orientation:** Diaphragm in vertical position. Consult factory for other position orientations.

**Process Connections:** 1/8" female NPT duplicate high and low pressure taps - one pair side and one pair back.

**Weight:** 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).

**Standard Accessories:** Two 1/8" NPT plugs for duplicate pressure taps, two 1/8" pipe thread to rubber tubing adapter and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for 3 adapters in MP & HP gage accessories.)

\*Low temperature models available as special option.

†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options at lower left.

## OPTIONS AND ACCESSORIES

### Transparent Overlays

Furnished in red and green to highlight and emphasize critical pressures.



### Adjustable Signal Flag

Integral with plastic gage cover. Available for most models except those with medium or high pressure construction. Can be ordered with gage or separate.



### LED Setpoint Indicator

Bright red LED on right of scale shows when setpoint is reached. Field adjustable from gage face, unit operates on 12-24 VDC. Requires MP or HP style cover and bezel.



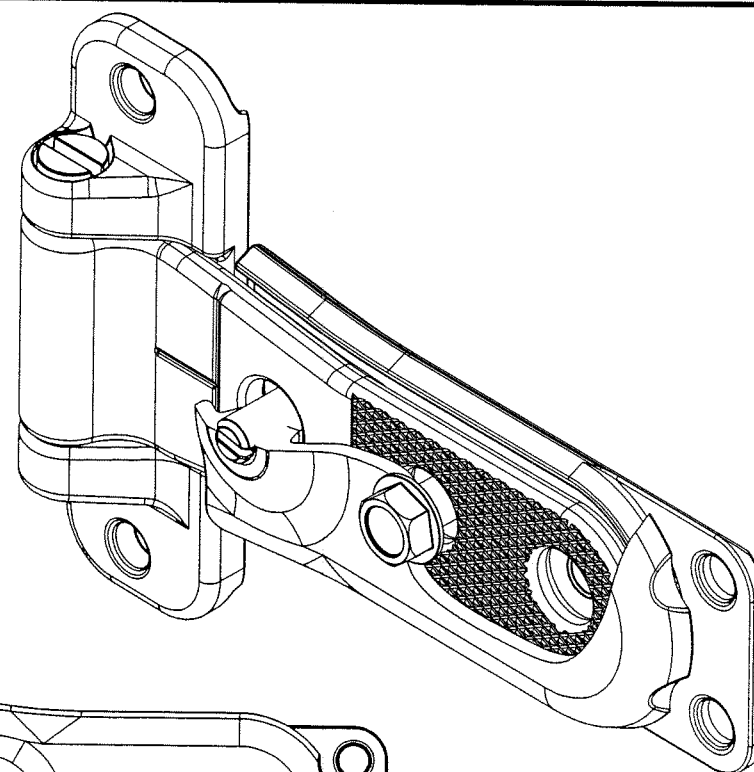
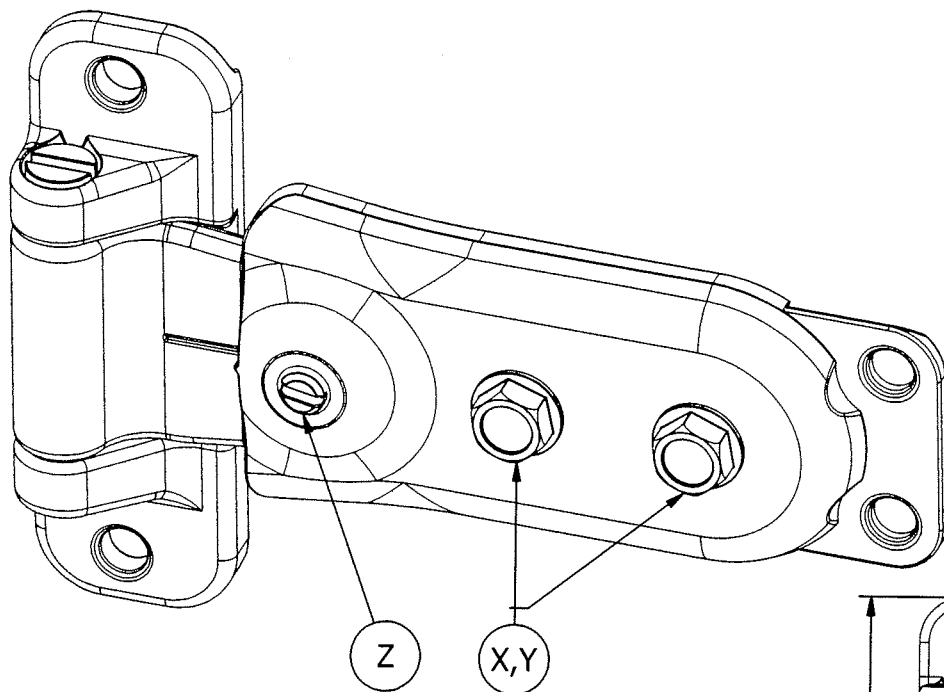
### Portable Units

Combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft. (2.7 m) of 3/16" I.D. rubber tubing, standhang bracket and terminal tube with holder.



### Air Filter Gage Accessory Package

Adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft. (1.5 m) lengths of 1/4" aluminum tubing two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves.



## ADJUSTMENT INSTRUCTIONS

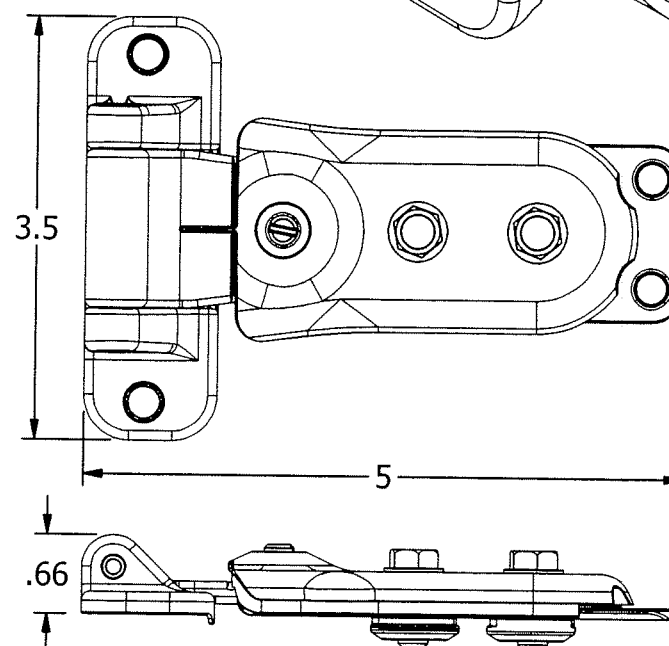
X,Y: Left / Right & Up / Down Adjustment

- Loosen both 1/4" bolts with a 3/8" Hex
- Move door to desired position
- Tighten both 1/4" bolts with a 3/8" Hex

Z: Compression Adjustment

- Tighten set screw to compress
- Loosen set screw to uncompress

Note: Adjustment must be made to all hinges at the same time.



SS3 = Stainless Steel / 3-Way Adjustable



15 EAST OKLAHOMA AVENUE OKARCHIE, OK 73762  
PH: (405) 263-7286 FAX: (405) 263-4924

## SS3 HINGE ADJUSTMENT INSTRUCTIONS

File Name:  
SS3 Hinge.dwg

Date:  
6-13-08

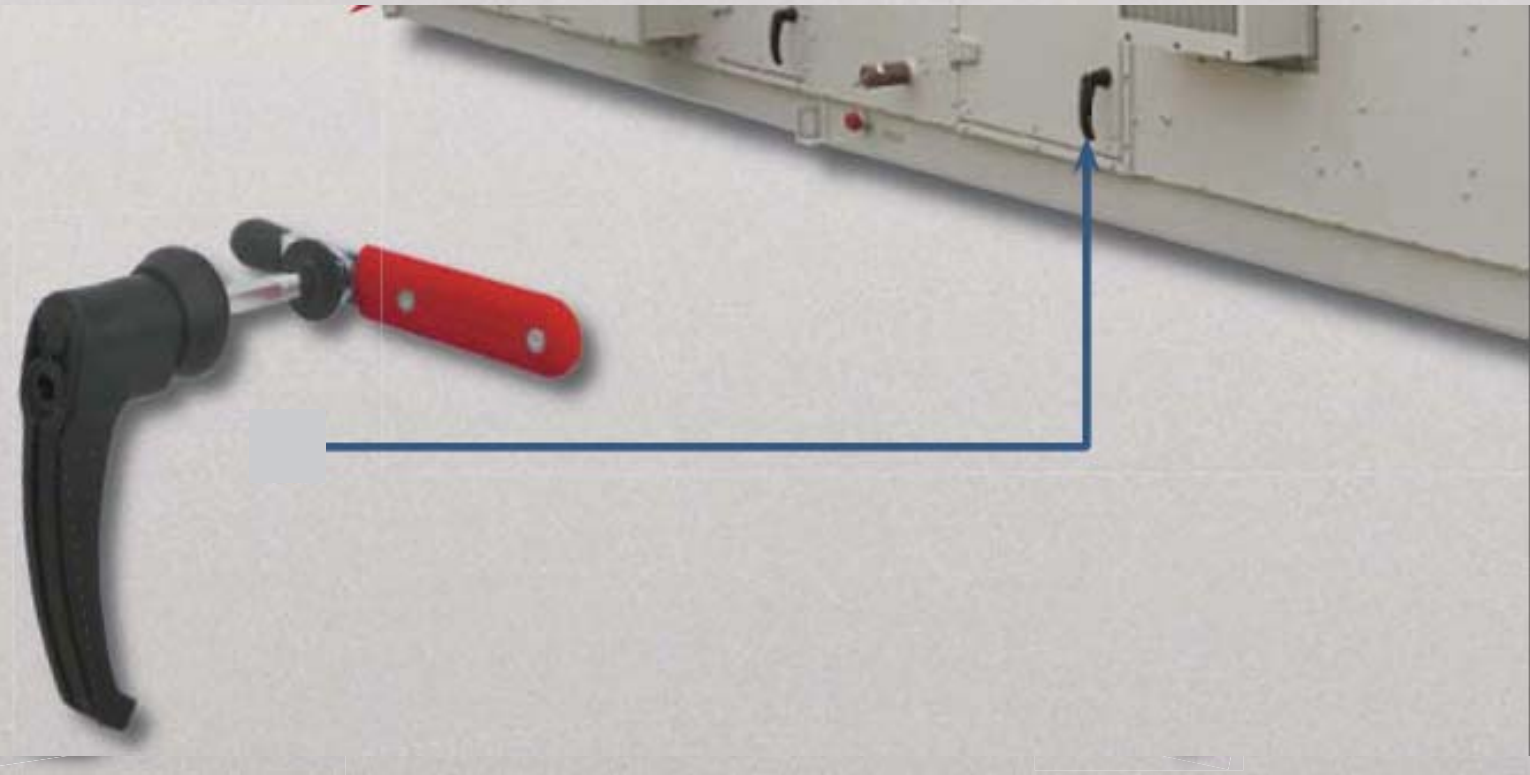


# Handles

Our innovative Klima-Flex ventilation handles are available in a variety of configurations and address many of the shortcomings of traditional designs. Durable glass reinforced nylon construction provides UV stability and thermal break. Tool operated, pad-lockable and key-locking versions are available to meet varied security requirements. To prevent breakage, the handles can be removed from the latching mechanism during shipping and installation. When partnered with other components in the Klima-Flex family these handles provide an industry leading latching solution for both in-swing and out-swing doors.



Part #	Locking feature	Door movement	Material
265076-00	Non-Locking	Out-Swing	PA6
265076-10	Key-Locking	Out-Swing	PA6
265076-30	5/16 Hex Tool	Out-Swing	PA6
265077-00	Pad-Lockable	Out-Swing	PA6
265076-02-16	Non-Locking	In-Swing	PA6
265076-12-16	Key-Locking	In-Swing	PA6
265076-32-16	5/16 Hex Tool	In-Swing	PA6
265076-62-10	Pad-Lockable	In-Swing	PA6
265076-52RD	Inside release	Out-Swing	CSR & PA6
26210010 RHG	Inside release w/ Roller	Out-Swing	CSR & PA6



# INVITATION FOR BID

## 12.0 QUOTE SHEET

QUOTE ON THE FOLLOWING ITEMS AS INDICATED OR EQUAL

**SCOPE: THE UNIVERSITY OF ALABAMA REQUESTS SEALED BIDS TO FURNISH AND DELIVER One (1) Indoor Air Handling Unit for Nott Hall AS PER ATTACHED GENERAL AND TECHNICAL SPECIFICATIONS OR EQUAL.**

### IMPORTANT NOTES:

- 12.1 The manufacturer and product number for each item that you are quoting must be completed for your bid to receive consideration.
- 12.2 **PLEASE INCLUDE PRODUCT/TECHNICAL SPECIFICATIONS FOR YOUR BID TO RECEIVE CONSIDERATION.**
- 12.3 All items must be fully warranted for a minimum period of the specified manufacturer's warranty. Service or replacements of any defective items are to be provided by the successful contractor at no charge to the University during the period of guarantee.
- 12.4 THE UNIT COST OF EACH ITEM must include any shipping and handling charges. Do NOT list shipping and handling as a separate charge. **QUOTE FOB THE UNIVERSITY OF ALABAMA, TUSCALOOSA, AL 35487.**

ITEM NO.	APPROX. QTY.	DESCRIPTION	TOTAL COST
1.	1 Each	Temtrol Indoor Air Handling Unit As per Attached Technical and General Specifications OR EQUAL	\$ _____

*\*If you quote an equal product, please submit equipment specifications and drawings with your bid response.*

MANUFACTURER \_\_\_\_\_

MODEL NO. \_\_\_\_\_

**Warranty on Equipment quoted:** (ATTACH ADDITIONAL PAGES IF NECESSARY)

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**Delivery of equipment is expected by April 27, 2015:**

Are you able to meet this delivery requirement: \_\_\_\_\_ Yes \_\_\_\_\_ No

If No, specify earliest delivery date ARO: \_\_\_\_\_

# THE UNIVERSITY OF ALABAMA

## **CERTIFICATION OF COMPLIANCE WITH THE STATE OF ALABAMA IMMIGRATION LAW**

The undersigned officer of \_\_\_\_\_ (Company)  
certifies to the Board of Trustees of the University of Alabama that the Company  
does not employ an individual or individuals within the State of Alabama.

\_\_\_\_\_  
SIGNATURE OF COMPANY OFFICER

\_\_\_\_\_  
PRINT COMPANY NAME

\_\_\_\_\_  
PRINT NAME OF COMPANY OFFICER

\_\_\_\_\_  
PRINT TITLE OF COMPANY OFFICER

\_\_\_\_\_  
DATE

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## Company Information

**Company Name:**[View/Edit](#)**Company ID Number:****Doing Business As (DBA)****Name:****DUNS Number:****Physical Location:****Address 1:****Address 2:****City:****State:****Zip Code:****County:****Mailing Address:****Address 1:****Address 2:****City:****State:****Zip Code:****Additional Information:****Employer Identification Number:****Total Number of Employees:****Parent Organization:****Administrator:****Organization Designation:****Employer Category:****Federal Contractor Category:****Employees being verified:****NAICS Code:**[View/Edit](#)**Total Hiring Sites:**[View/Edit](#)**Total Points of Contact:**[View/Edit](#)[View MOU](#)



## DISCLOSURE STATEMENT

1. Contract/Purchase Order No. \_\_\_\_\_
2. Name of Contract/Grantee: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
Telephone: \_\_\_\_\_  
Fax: \_\_\_\_\_
3. Nature of Contract/Grant: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. Does the contractor/grantee have any relationships with any employee or official of the University, or a family member of such employee or official, that will enable such employee or official, or his/her family member, to benefit from this contract? If so, please state the names, relationships, and nature of the benefit.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(For employees of the University, family members include spouse and dependents. For members of the Board of Trustees (officials), family members include spouse, dependents, adult children and their spouses, parents, in-laws, siblings and their spouses.)

This Disclosure Form will be available for public inspection upon request.

The above information is true and accurate, to the best of my knowledge.

\_\_\_\_\_  
Signature of Authorized Agent of Contractor/Grantee

Date: \_\_\_\_\_

RETURN FORM TO: The University of Alabama  
Purchasing Dept.  
Box 870130  
Tuscaloosa, AL 35487-0130  
Ph: (205) 348-5230  
Fax: (205) 348-8706  
[www.purchasing.ua.edu](http://www.purchasing.ua.edu)